Ascom Computer Tape

BCS's new home is where the hearth isn't

At the same time as the British Computer Society moved into its new headquarters at 13 Mansfield Street, London, thieves moved out a valuable Adam fireplace.

The mid-Georgian terrace of houses in Mansfield Street is of considerable architectural distinction, having been built by the Adams brothers, Robert and James, in the period 1770 to 1774. The marble fireplace was part of the original fittings of the building.

How the thieves managed to detach it from the wall and get it away undetected is not known.

Fireplaces are particularly famous as examples of the Adams' work, and there has been a considerable traffic in stolen ones recently.

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NEWS IN BRIEF

Key to Inmos in North East?

AN autumn start is expected for the microelectronics research institute being set up by Newcastle University, Newcastle Polytechnic, and CAP (UK), with £300,000 from Tyne and Wear County Council. Although discussion on the initiative started several months ago, the council hopes that it will be the key to enticing the National Enterprise Board's new Inmos venture to the North East.

The executive director of the institute is to be recruited from within CAP, and there is expected to be at least one senior member of staff from the US. The Polytechnic's Professor Hugh Jones is due to go there next month, recruiting.

Amdahl credit

UNDERLINING the high regard in which Amdahl is held by the financial community, the company has an agreement in principle from two foreign and five US banks for a $100 million multi-currency unsecured line of credit. Amdahl has no immediate plans to draw on the money but says that it will strengthen its plans for expansion in Europe.

Computer store

ANOTHER computer store is due to open next month, this time in Hemel Hempstead. To be run by John Miller Kirkpatrick, director of Bywood Electronics and designer of the Scrumpi range of microcomputers, it will be selling components systems and software from a wide range of suppliers. In addition to the Scrumpi range, the shop is expected to sell other systems, such as the Apple II, Pet, Sol and Cromemco ranges.

Small banks worried by cost of Chaps system

CONCERN about the cost and efficiency of the Clearing House Automated Payment System is being expressed by many of the smaller banks that will have to use the system when it goes live at about the end of 1980.

Chaps will run on an ICL 2960 system at the Bankers Automated Clearing Services centre at Edgware, which will be linked to ICL terminals at dozens of banks in London. The system is intended to take over from the existing method of clearing transactions.

Chaps is being set up by 12 leading UK banks which see great benefits in the system, but many of the UK branches of foreign banks that will also have to use Chaps are far from happy about the way it will work and expressed their concern at a series of seminars held in London last month at which they confronted the Chaps steering committee.

One leading foreign bank, the Australia and New Zealand, told Computer Weekly that it was most concerned about the lack of a direct interface between Chaps and users' systems. This would necessitate the laborious process of having to key in every transaction at the ICL terminal.

There was no intention of equipping Chaps users with something like the Swift Interface Device that enables users of the Swift International banking network to transfer a magnetic tape off their mainframe.

The same concern was expressed by a leading US bank which said that it would have to key in manually hundreds of transactions every day. Another worry was the possibility of the system at Edgware going down between updates so that transactions involving possibly many thousands of pounds would not be completed properly.

The main concern of the smaller foreign banks was the cost of Chaps. The Algemene Bank Nederland, for example, reckoned that using Chaps would cost it about £2 per transaction — more than employing a messenger. This cost was based on an estimated total outlay of £10,000 a year.

Replying to these criticism the chairman of the Chaps steering committee, Chris Gibbs, of Barclays Bank, said that the estimated cost per transaction in 1980 had been estimated at £1.25, for the average sized user, but he admitted that the cost for smaller users could be as high as £2.

On the question of there being no direct interface between Chaps and users' computer systems Gibbs said he thought that users would prefer human intervention in entering transactions involving very large sums.

Dealing the cards for Russia

A normal procedure in East-West trade relations caused Tory MP Fergus Montgomery to suggest that the British purchase of a large quantity of Christmas cards could be offset by Russian purchases of computers.

Montgomery claimed in the Commons adjournment debate that the number of cards involved, at least 20 million but possibly as high as 36 million, would hit the UK printing industry.

But, speaking for the card importers, Herbert Walker and Sons of Bingley, Yorks, Christopher Codrington of the London consultancy Interco said, "There is no direct connection between the Christmas cards and computer equipment."

He explained that the deal was done through Commercial Trading International, a US agency based in Vienna that handles goods going to and from the Soviet Union. These deals include the Russian Christmas cards, and computer supplies from a UK firm.

PO engineers' work-to-rule causes delays to computer users

THE work-to-rule and overtime ban by Post Office engineers is beginning to hit computer users, causing increased costs, disruption of service and delays in implementing systems, such as the IBM bureau centre in Warwick.

The Post Office chairman, Sir William Barlow, last week referred to the "immense damage being caused to the business life of the community" when he accepted a report by Lord McCarthy on the dispute, which recommended that a 37½-hour working week be introduced in two stages.

The Post Office Engineering Union, which is seeking for a 35-hour week, said that the report was not, on its own, a basis for settlement.

An IBM spokesman said the build-up of its Warwick bureau was delayed through waiting for lines. The company has also been installing its own 3750 exchanges for an internal telephone network, and these are not being connected to the public network.

Allied Breweries has been waiting for installation of several leased lines and in two cases has accepted dial-up lines instead. One subsidiary company says that dial-up communication is costing £1,000 a month instead of £3,000 a year.

Cost of the action has been put at about £100,000 by the Continental Illinois bank's telecommunications manager, John Balevic. This includes extra rental since the beginning of June when the move to new premises was scheduled, and the loss of income opportunity through the inconvenience of not having direct links to local brokers or to Reuters, Dow Jones or the Swift International banking network.

The bank was blacked by the engineers' union after Post Office management hooked up its private telephone exchange (CW, August 3).

Other data communications users, particularly service bureaux, confirmed that the engineers' action was causing extra costs and service delays, although they are unwilling to put an exact figure on the increased costs.

For example, a British Airways spokesman said, "We are a 24 hours a day, seven days a week operation and all our data communications activities are affected from reservations to interstation information, the worst time being at weekends. But we have not yet ground to a halt."

Threshold to take on 150 more students

THE future of the Threshold computer training scheme, in doubt through lack of funds (CW, July 6), now looks considerably more hopeful, following provisional agreement by the Manpower Services Commission to taking on 150 more students this year.

Threshold, which is run by the National Computing Centre for the benefit of school-leavers, has presented a problem to the MSC, which funds it, as the course does not fit in with the normal structure of its current Youth Opportunities Programme. However, in recent talks with NCC staff, the MSC expressed its desire to see Threshold continue, possibly funded in a different way if necessary.

Threshold may be expanded considerably over the next two years, ending up with twice the present number of students, but this will depend on whether the MSC can find the money.

Jenkins at BCS

IF you want to know what Clive Jenkins, general secretary of ASTMS, has to say about computers and the unions, go to the next lecture in the BCS series "Computer and Society — Servant or Master?" When the BCS sought a synopsis of the talk it was sharply told, "Mr Jenkins does not write speeches". So to get the Jenkins view go along to Theatre S075, LSE, Houghton Street, WC2, at 7.30 on Tuesday, September 12. Tickets are £1.50 for BCS members and £2 for others.

Disc storage costs out

[illegible] units for Honeywell Level 6 minicomputer units have been introduced by Telefile Computer Products of Chesham, Buckinghamshire.

The disc units, which use IBM 3330 technology, expand the possible disc storage capacity on [illegible] 1,200 Megabytes, at a cost, says Telefile, of less than £50 per Megabyte. Offered to both end-users and OEM system builders, who will get discounts for quantity orders, the drives are offered in capacities ranging from 25 to 300 Megabytes.

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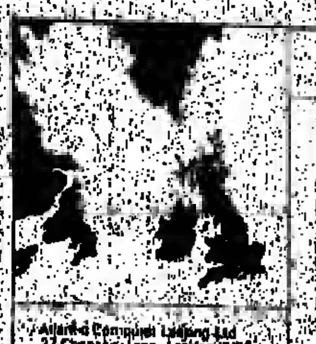

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Briefing

IBM splits its activities

LENDING weight to forecasts that IBM's 370 mainframe line will be succeeded by two separate series, the so-called E and H series (CW, March 30), the company has split its mainframe design and manufacturing division into two separate units.

The lower end embraces the 370 line from the 115 to the 148 and the higher end the 158, 168 and 3030 series machines. Mainframe marketing is not affected by the changes.

● Full details, page 5

Memorex defeat

IN what amounts to a defeat for Memorex in its $918 million antitrust action against IBM, Judge Samuel Conti has issued a directed verdict in favour of IBM at San Francisco Federal District Court. Judge Conti declared a mis-trial a few weeks ago after the jury failed to reach a unanimous verdict. Memorex says that it intends to appeal.

4,000 walk out

NEGOTIATIONS have gone ahead this week between the *Post Office* Engineering Union and the *Post Office* on the basis of Lord McCarthy's recommendations, despite the Post Office's original position that industrial action would first have to stop. The action continues, but has not escalated as had been threatened, although about 600 engineers have been sent home for refusing to connect equipment, and on Monday nearly 4,600 in Newcastle and London staged a one day walk-out in sympathy with those sent home.

PO crackdown

THE Post Office is cracking down on several small businesses that have sprung up to act as rerouters of international telex messages, taking advantage of low UK rates. Because of the low value of the pound, telex charges here are among the cheapest in the world.

Advisory council

AN advisory council made up of a group of executives from other organisations has been set up by Honeywell to assist the company in policy making and to advise on business policies and financial strategies. Chairman of the council is former Tory MP the Rt Hon Christopher Chataway, managing director of Orion Bank.

Personal plans

SPECULATION about Texas Instruments' plans to enter the personal computer field is firming up. With some industry observers now predicting an entry by the autumn, it seems clear that the company is thinking in terms of a range of at least three systems. These will be aimed at the professional market, with a high order of computational ability, the small business sector with large data capabilities but low computation capability, and the home, which will [illegible] a $200-500 system for solving [illegible] problems.

Chapple backs Joseph on relaxation of PO monopoly

CHAPPLE

SUPPORT for Sir Keith Joseph's determination to relax the Post Office monopoly of equipment connected to the telephone network, has come from Electrical, Electronic, Plumbing and Telecommunications Union general secretary Frank Chapple.

"Liberalisation of the supply of terminal equipment will be one of the earlier pieces of legislation of an incoming Conservative government," Sir Keith told Computer Weekly in an exclusive interview earlier this year (CW, April 27).

Chapple now believes that a free market in telecommunications attachments would stimulate demand, alleviating the risk to the jobs of many of his members employed by companies like Plessey, GEC and STC. He says that it is right for the Post Office to have a full range of standard equipment for sale or rental, but quite wrong to prevent users having the maximum choice.

He also believes that more choice and competition would strengthen UK telecommunications companies to compete in the world market.

Chapple echoes Sir Keith's statement in last week's Computer Weekly that the Post Office was now improving its clientship with suppliers.

"The manufacturers," he says, "seem inhibited by their fear of offending the Post Office in speaking out loudly and publicly on this issue. It is left to my union to see that the issue is raised publicly." He believes that the Post Office Board is now much more progressive and could be persuaded to adopt a liberal connection policy voluntarily, which he believes would be preferable to having it enforced by legislation.

Chapple's views are bitterly opposed by Bryan Stanley, general secretary of the Post Office Engineering Union.

"Mr Chapple's ideas would mean a massive loss of revenue for the Post Office, and customers would have to pay more to have the telephone network maintained and extended," he said.

The Post Office has consistently argued that liberalisation of its monopoly would benefit the few at the expense of the many.

Export boost for Prestel

TO boost international sales outside the US of Prestel, the Post Office viewdata service, the National Enterprise Board's systems house, Insac, has joined with GEC Computers and the Post Office to establish a joint marketing and servicing operation.

The aim is to offer systems support and software to customers, such as PTT authorities, which wish to adapt Prestel to their own requirements. Where required, software extension and enhancement will be provided by Insac's new Viewdata Systems International Division headed by John Graham, formerly managing director of ICL Hong Kong.

Orders for Prestel systems have so far been placed by PTT's in Germany (CW, September 1, 1977) and Holland (CW, June 15) and prospects include Hong Kong (CW, May 25) and Switzerland.

GEC system for private viewdata

By Tim Palmer

SOFTWARE which enables a Data General minicomputer to be used as a bulk updating terminal for the Post Office's Prestel service, and also as the basis of rival viewdata services, has been developed by the GEC Hirst Research Centre at Wembley. "We chose the Data General Nova because there is no comparable low-cost machine available in the GEC minicomputer line," a GEC spokesman explained. "However we do plan to rewrite the software for a GEC machine in the future."

At present GEC is concentrating primarily on the low-cost Nova version, but the software will run equally well on the large Data General Eclipse minis, and its availability will dramatically reduce the cost to companies wanting to set up rival viewdata services to compete with the Post Office's Prestel.

The Post Office has said that any organisation is free to set up a rival service, but will have to develop its own software (CW, October 6, 1977). Suitable software is now available from GEC, and the Post Office has no objection to competing services, because they further one of its principal aims: increased usage of the telephone network.

The terminal is, however, primarily aimed at information providers for the Post Office's Prestel viewdata service.

With the GEC software, a Nova mini can support up to eight full editing positions, each with editing keyboard and screen. As a private viewdata system, it will support up to 32 standard viewdata terminals or adapted television sets simultaneously. A floppy disc unit can store up to 250 pages, and a 10 Megabyte disc drive up to 6,000.

The software, which is written in assembler, has been designed to make the system easy to operate, and accommodates fast transmission to save on line charges to the Prestel computer.

One port of the minicomputer multiplexer is attached either to a 1200/1200 half duplex Datel 600 modem, or to a asynchronous line adaptor, enabling the Datel 2412 service to be used, in which case a 2400/2400 synchronous modem is required.

Several applications are currently envisaged for the GEC terminal, notably that of front-ending a mainframe computer and formatting the data

● Turn to page 8

DEC opens a shop

COMMERCIAL computer systems costing up to $25,000 can now be bought at a shop just opened by Digital Equipment at Manchester, New Hampshire. Goods ordered at the shop can be delivered the same day.

DEC in the UK says that has no plans to open a shop, but selling by direct mail campaign is being considered.

Mostek sues Inmos for trade secrets ban

LEGAL action against the NEB-backed advanced semiconductor company, Inmos, has been started by the US semiconductor company, Mostek, where two of the three Inmos founders previously worked.

The action, which the third Inmos founder, Iann Barron, found "flattering, and perhaps a sign that they are worried", involves the granting last week in a Dallas, Texas court of a temporary injunction against Inmos restricting former Mostek employees from passing on trade secrets to their new firm.

This was one of three injunctions applied for by Mostek. The other two, which were turned down by the court, were to prevent Inmos from recruiting Mostek employees, and to obtain information relating to the formation of Inmos.

The court will hear the third injunction next Monday.

As Computer Weekly went to press the NEB said that it had received no official communication about any proceedings by Mostek.

Woolworth stays with ICL

ONE of ICL's biggest customers in the retail industry, Woolworth, has decided to stay in the ICL fold and has placed a major order involving two 2970 systems.

The order was won by ICL in direct competition with IBM.

Woolworth's DP operations are based at two main centres at Swindon, Wiltshire, and Castleton, near Rochdale, Lancs. The line-up of hardware at Swindon includes two 1904As and one 1903A, while the Castleton centre has three 1904S machines and a 2960.

The retail industry is one of ICL's strongest areas, although it lost one of its other big retail customers, Tesco, to IBM late last year.

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THE TERMINAL SCENE
New applications call for new equipment, and peripherals and terminals are continually being developed to fulfil users' needs. Our special section deals with this important sector of the market and covers the role of the PCM, the benefits of high speed printing techniques, and looks at the impact of sophisticated terminals on the design of communications systems. Pages 11/13

GEC-FAIRCHILD VENTURE
To establish a UK microelectronics capability to match present day demands, GEC has tied up with US semiconductor house Fairchild. Martin Banks reports on developments. Page 3

TOTAL TELECOMM SERVICE
By offering a total service, AT&T hopes to secure for itself a sizeable share of the booming telecomms market. Hesh Wiener outlines some aspects of the Advanced Communications Service. Page 4

ALSO

Computerview on threat to OPMs	2
Focus on information	2
Impact of AT&T system	4
IBM splits division	5
Programmer Notes	6
Software File	5/7
Puzzler	7
Op Spot	8
Call for easier upgrade	9
People in the news	10
OPMs in US reach for top	14
Micro news	18
Computerstyle 2000 essay	18
The Hex Kid	45
Low-cost Level 62	48

APPOINTMENTS: PAGES 20-47

COMPUTER WEEKLY

Vol. 25 No. 614
Thursday, August 17, 1978

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Published weekly on Thursday
Registered at the Post Office as a newspaper. Price per copy 18p

IPC Business Press Ltd 1978.

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Computer Weekly is sent free of charge to the following categories in the UK and Eire only: Company directors, company secretaries, management services executives, civil servants responsible for computing, engineers/computer consultants, lecturers and teachers, DP managers/analysts, systems analysts/O & M staff, programmers, operators, computer staff.

Controlled Circulation Department: IPC Business Press (S. & Distribution) Ltd, 40 Bowling Green Lane, London EC1R ONE. Tel: 01-837 3636.

Subscriptions: readers outside the above categories: UK £14.50, overseas £20, USA, Canada $52. Students £7.20, overseas £18, USA $35. Airmail rates on request. Subscriptions: IPC Business Press (Sales & Distribution) Ltd, Oakfield House, Perrymount Road, Haywards Heath, Sussex RH16 3DH. Tel: 04 59188.

Back numbers are available for 40p post free.

Computer Weekly has a circulation each week of over 92,000, making it the highest-circulation computer publication in the UK. The international edition, which is published 10 times a year, has a circulation of over 34,000.

ISSN 0010-48

Hot shot execs a threat to DPMs

BESET by the demands of users on one side and the pressure of computer salesmen on the other, the DP manager might often feel the most misunderstood person in the computer world.

But in the US, at least, the role of the top DP executive is at last being recognised as one of the most vital in a company (see page 14). For the existing DP manager this opens many doors, including the one to the boardroom. But for those DP managers without the ability and imagination to take advantage of this increased status, it could mean the end of the path to corporate glory.

The writing on the installation wall is backed up by an example quoted in the Wall Street Journal of a multi-billion dollar insurance company which brought in a new man to oversee its computers. "He was picked for his reputation as a hot shot executive first and a computer whizz second, in the belief that his prowess as a businessman would give the data processing department greater respect with the managers, thus increasing its effectiveness."

There, in a nutshell, is the challenge and the threat.

DP managers who fail to recognise that we are on the verge of an information processing revolution will be swept away in the tide of "hot shot executives." For the data processing department as it is currently known will soon become part of the corporate information system, encompassing computers, the automated office, telecommunications, electronic mail — all the constituents of information technology.

The shortsighted DP manager who can see no further than this month's budget and yesterday's technology will be able to continue blissfully in ignorance for a little while yet.

Meantime, armed with micro Molotov cocktails, the user revolution will begin in areas remote from the DP centre and gradually encircle and overpower the lumbering department.

On the other hand, the visionary DP manager will perceive the future and will start preparing for it. The way ahead for DPM crusaders was summarised in the Journal by a quote from Joan Knutson, president of Associates for Human Resource Development, a New York computer consultancy.

She said: "We're seeing the beginnings of empire building, where the data processing executive tries to acquire as many other parts of the company as possible, taking over business forms design, the mail room, word processing and, in some cases, all administrative services."

Many DPMs still pooh-pooh the idea that we are on the verge of an information technology revolution, pointing to the difficulty of even getting the existing systems to work to full capacity. But, while it is true that the typical DP installation is more conservative than the rate of technological change would lead us to believe, that revolution has begun; the first shots have been fired and it is time for brave DPMs to step forward to a golden future and the rest to remain stuck in the DP mud.

● Computer Weekly and the Institute of Data Processing Management are running a workshop in October which tackles in a practical way the question of how the DP manager can best communicate with users in order to improve the status and influence of the DP department.

FOCUS

Engulfed by the info flow

THE flow of information, reports and helpful advice, all earmarked "for the attention of the DP manager," shows little sign of abatement. In fact, the info flow is engulfing many DPMs.

Keeping informed may well be an acceptable part of the DP manager's job. But by no means should it become the dominating factor. Some time should be allotted for the role of managing the computer installation and liaising with the rest of the company. As it is, management resources are more likely to be spent devising storage facilities for the escalating supplies of industry surveys, reports, books and sundry publications. Keeping pace with the DP industry info flow could well call for the attributes of Computastars.

Without doubt there is, somewhere, a well structured and organised DPM who has mastered the info problem. For the rest of us, an info survival kit is urgently required. Dumping is not necessarily the right approach. All too often, the company accountant calls for a culling of an article which he has heard about in last week's Computer Weekly; or the salesman asks whether the DPM noticed the comment on support services published last month. Such calls trigger an urgent waste bin retrieval application.

There has been no shortage of attempts in the past to collate the info flow. Various industry newsletters and digests have been floated which claim to glean the more important news features and developments from the general mass collection. The snags, as many users soon discover, are that all too often the digest refers back to the original item. It's then back to the paper-chase.

Solutions to the problem are few. Certain DPMs rely on sheer ignorance of industry happenings outside their own installation. For them, house magazines are more relevant than industry journals. Such managers can still be discovered operating ICT tab equipment. Others prefer to make use of their own intuition and, despite all evidence available, plunge deep into some passing strand of computing technology. These installations are still stranded and remote from the rest of the DP industry.

Keeping in touch for many DPMs ... making personal contact. A ten-minute chat at the local IDPM branch meeting is frequently more rewarding than any number of volumes of advice.

Close contacts could certainly be more rewarding (and a lot cheaper) than taking advantage of the James Martin Public Report Service, which is about to be unleashed on an already copious info marketplace. According to Computer Weekly (July 20), the aim of this particular series is to help DPMs to face the challenge of technology. The first report tackles computer networks and distributed processing. Apart from having abundant cash — each report is priced at $275 — the DP manager needs considerable time.

What to most DP managers will be the crunch of the report, "Types of computer networks", is not reached until chapter six. In the time taken to digest all 200 pages, the DP team could well have lost interest in a network project.

Maybe the National Computing Centre has the right idea. Its latest venture is a series of Talking Points, presented on audio cassettes. The scheme, I believe, is for small groups to gather for 45-minute info sessions. One projected topic is that of security.

Though just who is defending the installation while the talk proceeds isn't made clear.

Have a day out with the Computastars

After the Commonwealth Games come the Computastars finals. On Saturday, September 30, at the Crystal Palace sports centre in South London, athletes from all over the country will be competing for the honours in the biggest contest of its kind ever organised for computer personnel in the UK. Over 200 competitors will be taking part in a wide range of field and track events and those teams that reach the final rounds will have token part in every sport. If your company has a team in the contest — and even if it hasn't — come along and bring the family to cheer them on. Use the coupon below to book your tickets. Each ticket ensures a numbered seat under cover and provides access to refreshment and bar facilities.

Computastars has been organised by Goldsmith Recruitment International with the support of Computer Weekly.

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INTERRUPT

A STUDENT once had a program for the university minicomputer which took several hours to run. So he decided to run it overnight.

On the first night he loaded the program and it started running as predicted, reading records off the tape as required. The student went off home, carefully switching off the machine room lights so as not waste electricity.

In the morning he found the paper reader in an "unloaded" state although it had read only a few records. The engineer could find no fault, and the student could find no bug, so the student repeated his task on the second night ... and on the third ... and each time he found the same problem in the morning.

On the fourth night, the student and the engineer sat up together to see what was causing the fault. By the early hours of the morning it was clear everything was progressing much further than usual. While chatting, the engineer found out that the student had normally switched off the lights before leaving.

Suspecting an earthing fault, the engineer promptly switched off the lights. Nothing happened immediately. Then, as they sat there in the gloom, along came the cause of the trouble — a large, merrily buzzing fly. Attracted by the paper tape reader light, it flew through the beam and caused the reader to become unloaded. A rolled-up newspaper quickly fixed the fault.

The moral: it is not only hardware and software that can have a fly in the ointment.

● This week's £5 winning entry was submitted by Andrew Herbert, of Cambridge.

ATLANTIC

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Nett Assets	£1,897,662	£1,289,074

— continuing strong demand for 370 Flexlease leasing program — availability of second-user systems much improved — improved profits picture due in the main to greater productivity within the Sales Organisation and the availability of reasonably priced second-user 370 systems for lease — continued growth through 1978 expected with forecast turnover of at least £10m.

— extract from Managing Director's interim report

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Ten years ago...

COMPUTER WEEKLY AUGUST 15, 1968

ENGLISH Electric launched an Industrial Process and Control Division by amalgamating its Industrial Control and Automation divisions at Kidsgrove, Staffs. ... Cybernetics ... George ...

Systems, under a survey commissioned by the GPO ... Computers ... with ISM's 360 series ...

MARTIN BANKS REPORTS ON AN IMPORTANT NEW ANGLO-US MANUFACTURING VENTURE

GEC and Fairchild join to make micros in UK

HARD on the heels of the National Enterprise Board's Inmos venture into the world of advanced semiconductor manufacture, Britain's GEC and America's Fairchild have confirmed that they are to form a new joint company to make microprocessors and semiconductor memories in the UK (CW, August 10).

Unlike Inmos, however, the new venture will not be a totally separate entity. Speaking to Computer Weekly, Robert Clayton, technical director of GEC, emphasised that the two partners had joined together to set up a manufacturing company only. The marketing of the products it makes will be left either to Fairchild or GEC, depending on which partner originated the design, and/or which was more suited to approach a particular customer or application area.

In effect therefore, the new British-based manufacturing facility, when established, will basically be a "sub-contract" volume production house for the two partners.

Clayton indicated that, should the plant be located in one of the country's special development areas, GEC would take advantage of whatever government support was available. Such ventures can gain considerable financial help from the Department of Industry under the Industry Act to cover the cost of building and equipping new factories.

As the negotiations between the two partners had started well before the announcement of direct government support for microelectronics and microprocessors, its formation was not based on obtaining some of that money.

"Much of the £70 million is in fact for R&D work", Clayton pointed out, "and as a manufacturing operation, it would not be involved in such work".

According to Clayton, the products actually produced will be those "that are right for the market in 1981". Setting this in context, he said, "If the plant was operating now, it would be making general purpose 8-bit micros, 16K RAMs, and perhaps 64K CCD serial memories, because that is what the market is taking in volume."

Given the projected timescale for establishing the facility — by early 1980 — and the doubts that GEC has over the market potential of the 64K RAM, the 16K RAM will still be a prime product for the factory to produce. Like Inmos, there will be a heavy concentration on the standard N-channel MOS process but this will be complemented by Fairchild's charge coupled device (CCD) technology as a second string.

The aggressive timescale being set for the project will generally be a copy of Fairchild's existing NMOS production facility in San Jose, California. Much of the production equipment is, in fact, already on order.

The question of whether this lead will provide the partners with a long term lead in the marketplace is, however, more difficult to answer, for its devices will necessarily be based on existing design philosophies. Inmos presents greater risks, and the chance of perhaps greater rewards, by starting totally from scratch, with totally new philosophies. Only when the first Inmos products arrive will it be known whether they are right for the market.

Fairchild was chosen by GEC as its partner in this venture on the basis of mutual need, according to Clayton. Fairchild required another MOS facility, preferably sited in Europe; GEC wanted to expand the scope of its operations in the microelectronics market beyond the specialised position held by GEC Semiconductors.

"We could have done it by expanding GECS itself," said Clayton. "But Fairchild offered a better bet".

CLAYTON .... joined together in a manufacturing company only.

Now the search is on for 5,000 staff

WITH a projected requirement of about 1,000 people for the GEC-Fairchild joint venture semiconductor plant, the potential total requirement for semiconductor engineers and technologists, together with production workers, has suddenly risen in recent months to nearly 5,000 by the mid-1980's.

An estimated 4,000 of these will be created by the NEB's Inmos company when it starts production in this country.

One of the most crucial problems facing both of these new ventures — and the biggest potential block to their success — will be the country's capability in providing these people within the timescale.

There is already an enormous shortage of skilled staff in the UK, and the existing companies making semiconductors here find that poaching staff from their competitors is an essential way of life.

This aspect of recent developments has been pointed out by Conservative Party industry spokesman Sir Keith Joseph, who criticised the NEB's Inmos venture on these grounds.

He went on to criticise the present government's attitude to taxation and the way it has driven many skilled people abroad. "If ever there was an admission of the bad climate for individuals", he said, "it is this (Inmos). The bulk of the development work will be done in America rather than in this country".

Though it is hoped that many new skilled people will start coming through schools and universities to fill future jobs, it will be almost impossible for these two new ventures to avoid poaching staff from existing manufacturers.

French join in the attack

IF negotiations currently in progress come to fruition, the UK will soon have European company in its attack on the world market for advanced semiconductor devices. A new French company, Secimos, should soon come into being in a move that closely parallels Inmos and GEC-Fairchild. In the French case, however, the American interest comes from Intel and Mostek. See Micro News, page 16.

European expansion

ALTHOUGH it has a strong marketing presence in Europe, Fairchild has never truly established itself here as a manufacturer, as have other US companies such as Texas Instruments, Motorola and National Semiconductor.

It has, however, been close, twice. Some ten years ago it had a joint company with the Italian semiconductor manufacturer SGS, but both partners eventually went their separate ways. During the early seventies, it had a facility in Wiesbaden, West Germany, and at one time this was rumoured to be the company's new European MOS facility, but in the end the plant was never used.

Through GEC Semiconductors, GEC already has close links with another US semiconductor company, Intel. It is a major distributor for Intel products, and is capable of qualifying Intel devices for military and Post Office approvals.

The existing product lines of GEC Semiconductors, which will remain as a separate company from the new venture (CW, July 27), are heavily based in the special circuits area, but some of its recent developments in teletext, viewdata and telephone switching offer considerable potential as future mass-produced items, and may well be produced in volume in the new plant.

Fairchild's product lines have been more strongly based in the older, bipolar integrated circuit technology, and the company has a shorter track record in NMOS than many of its US rivals.

It was however, one of the early entrants into the microprocessor field, with its F8, 8-bit chip set. This design was subsequently taken by Mostek and turned into a single chip device called the 3870. Fairchild has since taken out a second source licence for this part.

Its latest micro product is the 9440, a 16-bit machine originally conceived to emulate the instruction set of the Data General MicroNova minicomputer. Its introduction was delayed by a writ from Data General, which alleged breach of trade secrets.

Though the device is now on the market with its own software suite, the law suit has still to be resolved.

Mersey police look into Plessey fraud allegations

MERSEYSIDE police commercial division is investigating an alleged fraud involving about £80,000 at Plessey's North-West division.

At the time of large scale redundancies 18 months ago, unions at Plessey looked into sub-contracting arrangements to see if any of the work could be done internally. Inconsistencies in contract paperwork appeared which were brought to the notice first of management, and later the police.

Eight months ago police began inquiring into the possibility that the company had been invoiced for work not done, invoiced twice for the same work, and overcharged.

Four people have been interviewed by police at Plessey and in two subcontracting firms in connection with the alleged fraud. A spokesman for the Merseyside fraud squad said that they are currently collecting statements to complete the case before presentation to the Director of Public Prosecutions.

The company confirmed that there was a police investigation of events alleged to have taken place at its Edge Lane site in 1977.

PM-DSYST-1

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If you know in advance that you will be coming, try to let us know. Telephone Mrs George or Mrs Wilson. Otherwise just come along, we shall be very pleased to see you.

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Wednesday 20th September	Manchester	Grand Hotel
Thursday 21st September	Birmingham	Post House Hotel
Monday 25th September	Bristol (Alveston)	Ship Post House Hotel
Tuesday 26th September	Exeter	Great Western Hotel
Wednesday 27th September	Southampton	Post House Hotel
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DOWNTIME
by Chad

Swansea keeps its cool

A MAJOR disaster has been averted in South Wales, you will be pleased to hear. I read in the Daily Mail, which was reporting on the strike at the Swansea licensing centre, that "Maintenance men have cut off the computer's air conditioning, without which it could overheat and blow up."

I was most relieved to read that the computer had been switched off, allowing the good people of Swansea to breathe easily again.

I had had visions of a most horrendous explosion, showering the town with sprockets, skip chains, push-down stacks, and so forth.

Bit of a letdown...

THE question I am most often asked by lay people awe-struck by the jargon of our mystical profession, is "What is software?" Doubtless you have had the same experience. Well, you can now direct them to that most authoritative of sources, the Times, in which there was a story recently under the headline: "Military software helps RFD to record."

The story is a bit puzzling to read, as one sees no mention of computers, but eventually it becomes clear what software is: parachutes and rubber dinghies.

So now you know.

Increased word power

I WAS interested to note that in the Fubhu pamphlet on The Computer and Society, so scathingly reviewed by my colleague Rory Johnston (CW, August 3), sinister implications are read into the arrangement between the AA and Readers Digest, which puts all AA members on the Readers Digest mailing list.

Junk mail from Readers Digest is unquestionably a nuisance, but I really could not see anything harmful in the magazine discovering the benefits of computer technology.

Not, that is, until another colleague pointed out that all the so-called off-beat items written about the computer industry inevitably land on my desk for processing.

Could I really, he asked, face with equanimity the prospect of having to read, every month, the latest of an unending stream of features entitled "The most unforgettable computer I have ever known"?

● I am heartbroken to have missed a guest editorial in the New York Times that I see mentioned in the paper's annual report. Admiral Elmo Zumwalt was writing about "The importance of Mickey Mouse".

be prepared

our supervisor
(Ms Valli Dater by name)
was quite a card
until she found
the key to discovery
one tea break
while resting
in the margins cool
of the typing pool

"My future," said she
(Ms Valli Dater, the
same)
"lies with Mark"
(O.C.R. Snr by nickname)
for he,
with his ECMA fount B
suave executive style,
is where all Valli's
tomorrows begin

being quite a character
in his own (read) right,
dear old Mark
lost no mill time
in popping the question
(//WL U MRYME?)

Although our own single
punched card days
are numbered (1 to 80?)
and her vision
of an OCR future
was a wise decision,
we will miss Ms Valli—
the finest 80 col doll
ever to graduate
from our exclusive
data Prep School

malcolm poltu

In a long-awaited petition to the Federal Communications Commission, American Telephone and Telegraph formally asked the government to approve in principle its establishment of an intelligent digital network called Advanced Communications Service. Here HESH WIENER describes some of the benefits to users and the possible impact of such systems on the communications industry.

Impact of AT&T system on the telecoms industry

THE full implications of such services as AT&T's proposed Advanced Communications Service (CW, July 27), have, perhaps, not been adequately appreciated by the potential users, the PTT authorities, or by equipment manufacturers. According to AT&T, the service, which would be offered on a nationwide basis, would allow terminals and computers to be connected with unprecedented ease.

Should the FCC approve the advent of ACS, a tariff schedule would be developed by AT&T by the middle of 1979. The network could go on the air shortly after the tariff is approved, using some existing Bell System components to serve initial customers.

The service would benefit a wide variety of users, and enable smaller organisations to develop communications-based applications that at present are not economically feasible because the initial costs are very high.

On the other hand, companies selling equipment which provides users with functions that will be available through ACS may suffer. IBM in particular, may have to rethink its approach to communications because the bit-orientated transmission scheme proposed by AT&T follows X25 guidelines rather than IBM's SDLC protocol.

"The ACS announcement must be very disturbing news for IBM," declared Charles Lecht, president of Advanced Computer Techniques Corp. "In the final analysis, IBM would have to view ACS as a Federally-sponsored alternative to the purchase of IBM equipment."

Indeed, sources close to IBM management said that there were long faces in Armonk when the news of ACS broke. IBM, which has invested heavily in the promotion of its own communications techniques and is deeply committed to Satellite Business Systems, may be impacted in unforseeable ways by the ACS announcement. User organisations may pause and reflect on the AT&T offering before they expand existing communications applications. This could slow orders for terminals, communications processors and related gear, regardless of the ultimate FCC decision on the AT&T service offering.

The system proposed by AT&T consists of local nodes scattered throughout the US, interconnected by high-speed digital links. The nodes, according to observers at the AT&T Press conference, would be initially built of computers made by Digital Equipment Corp.

Of the 3.6 million terminals and computers expected to be in use in the US by 1983, 137,000 would be attached to ACS, the company believes. This base is enough to make the service economically viable, according to the FCC filing.

Speculation has centred on the PDP-11/70 using AT&T's UNIX operating system as a node processor.

ACS would allow users to connect terminals with a variety of codes, communication speeds and protocols. Similarly, computers using any of several communications techniques could be hooked up to ACS. The service would provide translation between disparate codes, data speeds and protocols. It would allow packets of information to move at different speeds through the network under different cost and priority arrangements.

But the ability to accommodate mixtures of terminals and computers from different vendors is only the beginning of the ACS facilities. Messages could be stored locally at the point of origination or gathered at the destination point. Users could specify a time of release for messages, which could have multiple addressees. Other facilities would allow data from various terminals to be pooled, and would permit individual messages to be built by combining sections of old messages with new material. Additionally, the address of a message could be woven into its text automatically.

In brief, the system would have features that satisfy the needs of interactive users, remote batch users, electronic mail users, users of digitised facsmile devices and users of high-speed telecommunications links.

In preparing its initial ACS specifications, AT&T studied more than 2,000 applications of data communications in business, education and government. In addition, the company conducted detailed interviews with 65 major data communications users in 23 different industry segments. AT&T officials also reviewed reports prepared by various outside organisations.

AT&T has made some estimates of the number of users that would be on ACS initially. Of the 3.6 million terminals and computers expected to be in use in the US by 1983, 137,000 would be attached to ACS, the company believes. This base is enough to make the service economically viable, according to the FCC filing.

In addition, there may be ACS services provided to competing carriers. AT&T's statement specified that ACS would be capable of interconnection with other networks and carrier services.

Among the applications specified by AT&T that would be appropriate for ACS are order entry, freight control systems, travel reservations systems, medical information systems and insurance claims processing.

Three modes of message delivery would be incorporated in ACS: automatic, scheduled and demand. Automatic delivery provides routing, at the user's chosen speed and priority, between sender and receiver. Scheduled transmission provides the sender with an opportunity to specify when a message will be delivered, and demand delivery allows the receiver to tap a local storage pool and receive all messages stored therein.

The transmission schemes possible with ACS, during its initial phases, include Ascii character asynchronous transmission, asynchronous transmission in block mode, asynchronous transmission in polled mode, synchronous transmission in polled mode and synchronous transmission in bisync contention mode. Additionally, host computers may engage in high-speed communications in bisynchronous mode or use the bit-oriented X25 protocol. Emulation of terminal networks will be available for users with a commitment to existing terminal systems so that ACS would appear to their computers as an array of terminals attached to previously-used communications processors.

Messages could be stored and forwarded as users might require. In addition, users would be able to define what AT&T calls "virtual subnetworks," clusters of terminals that are interconnected in specified ways to provide intercompany facilities, an alternative to present systems of leased lines and small communications processors or terminal clusters.

"If the array of standard offerings is not to a user's liking, ACS will permit customers to develop their own communications programs and have these programs inserted into the node processors of the network. AT&T personnel will be available to help users meet such special needs, thus applications that fell outside the broad definition of ACS facilities may be implemented using whatever combination of network features the user might require.

Software for X25 on Series 1 available soon

COMMUNICATIONS software for X25 applications on IBM Series 1 will be available in the US from Systar Corp of San Jose, California in November. It should be available in Europe by next February.

Systar president David Retz claimed his Series 1 based system had the advantage over Telenet's TP 4000 of user-programmability. There was a good market for it, he said, especially since AT&T announced X25 capability with its Advanced Communications Service (CW, July 27). IBM itself had only offered an X25 system for its Series 1 in France and Canada.

The Systar package's four modules include an interactive terminal interface and a multi-tasking module using the Series 1 communications adapter.

Retz and colleagues set up Systar two years ago to produce PDP-11 communications software after working on Arpanet at Stanford Research Institute but six months ago switched over to Series 1 software.

IBM split into more manageable units

THE splitting by IBM of its data processing activities into two units (see front page), is generally seen as a move on IBM's behalf to break the company down into more manageable pieces, and to promote more "creative competition" between different parts of the company, as already exists between Data Processing and General Systems.

Commenting on the split, Gideon Gartner, computer industry analyst with New York stockbrokers Oppenheimer and Co, told Computer Weekly: "IBM does not want intermediate systems to play second fiddle to large systems.

"It goes back to the structure they had prior to the 360, when there were different groups for different computer architectures. They now have different architectures in the sense that they have a variety of operating systems.

"My guess is that the low-end operating system would be DOS/VS, with VS/1 and VS/2 at the high end, with VM/370 covering both." OS/VS2 version one is now better known as SVS, and OS/VS2 version two as MVS.

There have been suggestions that IBM has a fourth 3030 series machine in the pipeline to slot in below the 3031; Gartner was sceptical about this but did not rule it out.

"It appears that the E-series, which is now called something else, will be exceedingly competitive, much more so than the 2:1 price-performance improvement suggested by some commentators. The E-Series will be very aggressive, and in that case, the top machine may well slip well below the 370/148, which would leave a big price gap to the 3030 machines. IBM could eventually fill this with a powerful price-performer in the 3030 series which would leave no gap between the low end and the high end.

"But even this would be unusual, because there is considerable overlap between the GSD products — System 3, System 34 — and the low-end 370s, so a similar overlap may well develop between the low-end and high-end 370 successors. But that is for the future."

Executives named

THE IBM split has been made in what was formerly called the System Products division. That name is retained for the lowest end, and takes in the Endicott, New York, plant which is involved in manufacture of the 138, 148 and components, and also the development establishment at Boeblingen, West Germany, where much of the development of the E-series is said to be under way.

A new Data Systems division includes four major New York plants. These are Poughkeepsie where the 3030 series was largely developed and is manufactured; East Fishkill, responsible for logic and memories; Kingston, which tests machines from Poughkeepsie; and Brooklyn, responsible for printers.

The Data Systems division is headed by John Bertram, formerly vice-president of development and manufacturing of the old System Products division.

The new System Products division is headed by James Kuenier, who was an assistant group executive of the Data Processing Products group, into which both the new divisions fall.

Ferranti moves into Glasgow

An expanded design and development capability is being planned by the Scottish division of Ferranti, and for the first time, the company will be moving into the Glasgow area to house the expansion.

The company is taking a lense on a 20,000 square foot factory on the Bellshill industrial estate, and is planning to create about 180 new jobs for computer programmers, draughtsmen and design and test engineers. The new staff will be working on inertial navigation.

Like most companies in the computer and electronics industries, Ferranti is labour limited, and this first move away from the Edinburgh area is hoped to open up a new source of labour. There is one other Ferranti factory in Glasgow, the Cetec plant, which merged with Ferranti last year.

Plessey moves into new era

INTEGRATED information handling systems is now Plessey's main field of business, says chairman Sir John Clark. He states in the company's annual report, that this is due to convergence of telephone exchange technology with its other products such as military radios, facsimile transmission.

Profits declined in the report are £42.9 million, up from £40.3 million last year. This is on worldwide sales of £611 million, of which £120 million come from UK exports. Telecommunications accounts for 40 per cent of total sales.

'Pru' chooses MicroCobol

AN order for a MicroCobol system using IBM Series 1 hardware has been placed with CAP by the Prudential Assurance Company.

The online system, which will be the first in the financial sector to use CAP's MicroCobol, will handle the accounting of reinsurance treaties.

The application will in addition use CAP's AutoClerk system, which provides portable routines for file maintenance and report generation.

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Applications for copies of the Operational Requirement must be received by 8 September, 1978.

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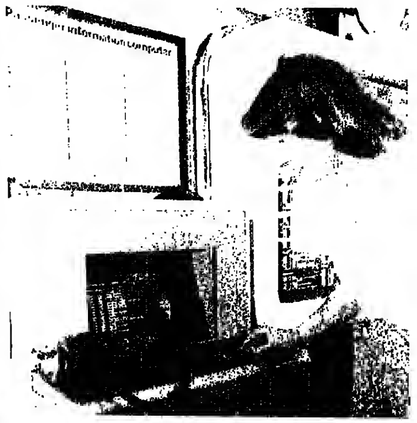

Do-it-yourself train times

Direct interaction with a computer is now available to travellers at King's Cross station in London, where an Extel Microfilo computer system has been installed to provide train information. The traveller keys in a code number relating to one of 48 stations served from King's Cross and also indicates the day of travel and whether the journey is outward or return. The Microfilo system then retrieves information such as times and details of trains from files stored on floppy discs and displays it on the screen in front of the traveller. The travel information is updated from a master terminal.

German teaching Plan

LANGUAGE instruction by computer is being developed at the University of Hull, where students can get individual drilling in German grammar and vocabulary on an ICL 1904S.

Dr R. W. Last, a senior lecturer in the German Department, wrote the software entirely in Plan (1900 assembler), limited as he was by the amount of core available while the program was online. Exercises are entered into data files in a special code. They can work by question and answer or by multiple choice. Students get two attempts at each question; failed questions are recycled.

Answers to questions are short: usually one word plus a preceding article, so the software does not have to analyse syntax. Exercises in Dutch are to be introduced soon.

Dr Last says he finds the computer system better than a programmed learning textbook because it is "more interactive," and cheating is impossible. The students like it, he says, because it is private and they can go at their own pace.

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IBM 80/A 100		240	200	170
Olympia ES110	3295	199	150	125
Data Recall Diamond 24K Memory	7000	359	359	282
DIGITAL WORD PROCESSOR				
WS78 Dual Floppy, VDU, Printer	9975	620	475	395
WS200 4 Floppy Discs, 2 VDU's, Printer	18250		795	695
DIGITAL MINI-COMPUTERS				
PDP 11/03		505	378	315
PDP 11/03		1104	828	690
PDP 1103 DECLab		794	596	497
HEWLETT PACKARD DESK TOP COMPUTERS				
9845S		1160	870	725
9831A		415	311	259
9830		413	260	217
9825		339	269	223
9815A		213	160	133
9810A		339	271	226
9862A X-Y Plotter		221	162	135
98668 Printer		216	162	135
9871A Printer/Plotter		240	180	150
9872A 4 Pen X-Y Plotter		288	216	180
9877A External Tape Unit		124	93	77
9878A I/O Expander		68	51	43
9885M Flexible Disc Drive Master		221	165	139
7245A Printer/Plotter		308	231	193
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5100		528	484	382
5103 Printer		130	120	108
TEKTRONIX GRAPHIC COMPUTING SYSTEM				
4051		354	265	221
4631 Hard Copy Unit		265	191	160
4662 X-Y Plotter		242	182	151
4956 Graphic Tablet		445	334	279
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Tektronix 8002		573	407	339
DIGITAL TERMINALS				
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MICHIE'S PRIVATEVIEW

Prophecies that weren't so far-out

SINCE early days, research workers in artificial intelligence have been accused of uttering wild-eyed prophecies which are then not fulfilled. The chief accusers have been physicist-politicians prematurely fretful for their own role as society's official miracle men. The chief loser has been the taxpayer, whose investment in timely and promising research has on occasion gone to the wall.

But has there not been some truth in the charge? Let us see. Enough time has by now flowed beneath the bridge for it to be possible to compare old prophecies with subsequent developments or non-developments.

As a start, I rummaged in an old article of mine entitled "Computer — servant or master". Published exactly 10 years ago, its first prophecy reads:

"I am fairly optimistic, if that is the right word, about the rate of progress in our own and other similar laboratories elsewhere, in Britain and abroad. I qualify the word 'optimistic' because many people view the objectives of such work with deep unease. If informed that by the late 1970s the first intelligent machines will be in our midst, their dominant feeling would not be one of optimism, but rather of gloom and anxiety. I shall leave to a later stage the discussion of whether there is justification for these fears — dehumanisation of life, mass redundancy among brainworkers, suffocation of man by surplus leisure, computer-aided snoopers and 'thought-police' . . ."

I find myself unrepentant of these words. Indeed in 1978 they have acquired a topical ring. We can of course quibble about just what was meant by "the first intelligent machines". But the same article's definitions would certainly apply to some of today's "expert systems" (see CW, January 5 and April 13).

A later passage speaks in highly specific terms of a

". . . question-answering facility which will one day become available as a service. Not only schools, hospitals and commercial firms but also the ordinary householder will be able to tap information and problem-solving power from a national computing grid with the same ease and immediacy as that with which he now draws on central supplies of gas, water and electricity. Along with question-answering services, which will allow us to inquire about restaurants in our locality or politics in Paraguay, will come the games opponent, the puzzle-setter, and the quiz-master. An increasing demand upon computer systems will be for aid in coping in a stimulating way with the growing burden of leisure."

That was written in 1968, 10 years before viewdata. Let us turn to some other forecasters.

In 1973 results were published of a Delphic survey using techniques employed by large corporations for technological forecasting, and by Chris Evans for a Computer Weekly study (CW, January 26). The essential findings of the 1973 forecast, made by AI scientists from Stanford Research Institute and Lockheed, in the US, are summarised in the accompanying table. Only five years have elapsed since then. Subsequent history has not as yet diverged from prediction. For five of the items the "median prototype data" was estimated for 1978 or earlier. Using the reference numbers from the table we can say the following.

P5. Convincing prototypes exist for computer identification of personnel by signature, voice and photographs. Details of the latter can be got from Leon Harmon, Department of Electrical Engineering, Case Western Reserve University, Cleveland, Ohio, USA.

P8. Working systems exist for congenital heart disease, thyroid enlargements, acute abdominal pain and internal medicine more generally, urinary infections and bacteriaemia, and other clinical areas.

P13. "Industrial robot" as used here implies optical and tactile sensing in addition to programmable manipulation. Numerous such devices have now been demonstrated and commercial systems are under development, notably by Unimation Corp, in the US.

P1. Laboratory prototypes are capable of inferential question-answering in addition to ordinary database interrogation.

P14. Prototype systems allow the customer to place orders by interactive terminal, with computer-generated voice response. Commercial installations are expected considerably earlier than the Delphic estimate of 1983.

But this becomes unrewarding. The noteworthy feature of such forecasts is not, as AI's critics allege, prediction of things which didn't happen, but rather the failure to predict things which did.

Nobody predicted the pattern of distributed intelligence now arising from the microprocessor revolution. Nor has any awareness been apparent of a new hazard from advancing hardware technology, namely inscrutability of ultra-powerful machine problem-solvers. I have aired this topic before (CW, October 27, 1977, January 19, and July 20), and will not return to it, except to re-affirm my belief that certificates of humanoid mentality should be demanded before critically responsible tasks are entrusted to machine systems.

For a long time now motorists have had to have their vehicles certificated for roadworthiness. More recently society has extended its interest beyond the question of whether the vehicle functions reliably, to the question: "Does it also make an intolerable noise, or emit clouds of poisonous fumes?"

I foresee a time when any computing system on whose functioning large numbers of people depend will be refused certification if its strategies are hidden in clouds of impenetrable complexity.

As an elaboration of this thought, the next Privateview will venture a scenario for the "Cognitive City" of the year 2001 AD.

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SUMMARY OF DELPHIC RESULTS

Products	Median Prototype Date	Median Commercial Date
High potential significance		
P5 —Automatic identification system	1976	1980
P8 —Automatic diagnostician	1977	1992
P13—Industrial robot	1977	1980
P1 —Automated inquiry system	1978	1988
P9 —Personal biological model	1990	1985
P11—Computer-controlled artificial organs	1980	1990
P18—Robot tutor	1983	1998
P16—Insightful economic model	1984	1990
P2 —Automated intelligence system	1985	1991
P20—General factotum	2000	2010
Medium potential significance		
P14—Voice response order-taker	1978	1993
P15—Insightful weather analysis system	1980	1995
P3 —Talking typewriter	1985	1992
P6 —Mobile robot	1985	1998
P4 —Automatic language translator	1987	1995
P12—Computer arbiter	1988	1998
P10—Computer psychiatrist	1990	2000
P17—Robot chauffeur	1992	2000
P21—Creation and valuation system	1994	2003
Low potential significance		
P19—Universal game player	1980	1985
P7 —Animal/machine symbiont	2000	2010

SOFTWARE FILE-1

Six-machine network can be extended to X25, says Prime

A NETWORKING capability has been developed by Prime which allows one Prime computer to be linked with up to four others locally, via interprocessor connection, and with up to two remote machines, via high speed synchronous communication links.

Called Primenet — and released with Revision 15 of the Primos operating system — the software is capable of being extended to conform to X25 protocols, according to Prime.

It is also intended that any Primenet network will be capable of linking with a packet switched network, such as Telenet or Tymnet.

Major features of Primenet include facilities for file sharing and file transfer, remote login, and sharing of peripherals. The system thus offers significant opportunities for the development of distributed processing applications.

With file sharing, standard file calls can be used to manipulate disc files anywhere within the network. Files may therefore be connected to any Prime computer in the network, in addition to the one logged in to.

Remote login similarly allows a terminal user to log into and interact with any computer in the network. This enables the user for example to make use of the extra processing power or memory space available on another system.

Primenet in addition enables users to share a number of I/O devices in the network. Printing, for example, can be done remotely or locally.

Atom men develop lorry scheduling system

A VEHICLE scheduling program developed by the Harwell Atomic Energy Research Establishment is to be marketed by Transportation Planning Associates of Birmingham.

The software, Harwell Vehicle Routing Program, includes a facility for defining and accessing road network information at local, regional, or national level, and is said to be able to cope with any constraints likely to be met in the real world.

Capable of creating both daily and weekly schedules, the package can also be used to optimise on existing service schedule. Separate outputs are produced by vehicle, for use by drivers, and by customer, for use in establishing delivery dates.

The program, written in Fortran, currently runs on an IBM 370, and can be accessed by remote terminal. TPA will also sell or lease the software for use on an in-house machine, or for mounting on an agreed bureau.

Systemsolve launches pensions admin pack

A PENSION administration package has been launched by Systemsolve (Computer Services) following three recent contracts to implement pension systems for customers.

The software, Pensolve, can be run on a wide range of hardware and is also available as a bureau service, based on the company's ICL 2903 installation.

The requirements of new government legislation have obliged many pension fund managers to re-examine their current systems, according to Systemsolve managing director John Stanley.

Increasingly, the amount of information to be processed has led to the installation of small in-house computer systems.

Pensolve, which is applicable to both fund-based and insurance-based schemes, generates DHSS and Board of Trade returns automatically and can also automate the calculation and payment of benefits.

The package in addition provides strict controls and accounts in the area of contributions or premiums. It can be operated in either batch or online mode.

UCC German deal

THE German Post Office is to use University Computing Company's DOS to OS conversion aid, UCC Two, which enables DOS programs to run under OS without recompilation. The Posttechnisches Zentralamt department has signed a licence agreement with UCC covering use of the software at eight of its IBM installations in West Germany.

SOFTWARE FILE-2

EDITED BY PETER HEWITT

EEC concern over use of firmware in minis

THE EEC is understood to be concerned that the growing use of firmware in minicomputers could have an adverse effect on the future potential for software portability.

At the same time, the increasing tendency to implement software functions in hardware has been highlighted by announcements from Interdata and the minicomputer division of Sperry Univac (see right).

The rapid pace of development in small systems architecture, including the growing tendency to incorporate specialised microprocessors, is cited as the major justification for an imminent EEC study in the area of portability.

The project, one of three for which the Commission has requested proposals (CW, August 10), is entitled "Study on the feasibility of developing a common software interface for minicomputers".

In the invitation to tender, the Commission specifies a number of tasks which the contractor must undertake.

In one task, contractors are called upon to analyse the possible use of microprocessors for implementing operating systems functions, and to assess the impact that this would have on the technical and economic feasibility of a standard software interface.

A previous task calls for the contractor to identify, in terms of I/O parameters and processing features, the basic common functions which would be accessed via such an interface.

Although the optimum level for implementing a standard interface is not pre-judged by the tender documents, specific functional modules mentioned include those for supervision, monitoring, scheduling, processing, and organisation of memory.

A common interface to such functions from communications and applications software would facilitate portability of applications and would help connection to other equipment, the document notes.

However, were operating system functions to be widely implemented in firmware, the technical and economic obstacles to establishing a standard interface could be greatly increased, it implies.

The Commission appears not to have ruled out the possibility of developing a standard common nucleus for minicomputer operating systems.

Constituting a portable operating system, such a product would be written in the proposed European Systems Language (ESL), the subject of one of the other studies (CW, August 10).

ESL is described in the official journal of the EEC as a prerequisite for the realisation of all the portable products envisaged, both in the operating system area and in the area of the third study, namely software conversion tools.

Its development, notes the Council of Ministers, must therefore be regarded as a matter of the utmost priority.

The EEC is particularly concerned about the compatibility and portability of software in distributed processing environments. Study of the possible common software interface is therefore to focus initially on telecommunication and data transmission applications.

According to the journal, a large number of manufacturers have expressed interest in the possibility of developing an advanced level software interface.

The principal benefits expected are said to be longer life for software products, and the possibility of wider integration of products which might otherwise be incompatible.

Users would enjoy greater freedom of choice, and greater flexibility would be possible in the organisation of distributed processing systems.

The journal also notes that since software development costs are continuously and dramatically increasing, the general economic benefit of a standard would not be negligible.

However, it is acknowledged that the approach could have disadvantages, particularly for certain large companies selling complete problem solutions. Such companies see the specific nature of their products as a protection of the market, it says, and, if the market is sufficiently large, an ad hoc solution may well prove more economical and efficient.

In all the studies, the EEC shows a keen interest in the commercial context of the proposals. Contractors are explicitly tasked with investigating the economic viability and acceptability of the proposed products.

An interesting aspect is that, if the portable products which result are commercially successful, the Commission intends to recover its costs in developing them:

"Funds given to industry for their realisation will be reimbursed to the Community according to a formula to be defined within the general context of the administration of projects and of the medium-term programme."

Univac addition to Vortex ops system

A FIRMWARE accelerator for its Vortex-II multi-tasking operating system has been announced by Univac. Meanwhile, Interdata has released a microcoded run-time assist package for Fortran VI programs on the model 8/32 Megamini.

Available only on the V77-600, the Univac package speeds the execution of the Vortex-II resident nucleus, giving a 20% to 40% increase in available CPU cycles, says the company.

The microcode requires 1,024 words of writable control store (WCS), and is provided free when the WCS hardware is purchased. The V77-600 can support up to 4096 words of WCS in total, which may also be used to implement the existing commercial and scientific firmware libraries, each taking 512 words, as well as user-written firmware.

Scheduled for release in the fourth quarter of the year, the accelerator is designed particularly to provide throughput improvements in multiple terminal/multi-tasking environments characterised by a large interrupt servicing overhead.

The company also announced conventional enhancements to the operating system which are available immediately. These include a multi-tasking output spooler, a tape labelling facility, simplified system generation procedures and debugging.

Interdata's Fortran Enhancement Package implements a variety of Fortran run-time routines in a new 2K WCS module. Transparent to user programs, the microcode is said to increase the execution speed of the routines by two to three times over assembly level implementation.

Routines implemented include single and double precision trigonometric functions, and real and double exponentiation.

The package, which costs £4,230, also provides 512 words of free memory.

Cullinane Corp in US goes public

THE Cullinane Corporation, best known for the database management system IDMS, has gone public in the US, while claiming to be the first software products company to do so in the last ten years. The success of the launch, on the American Stock Exchange, should do much to improve the status of software companies in the eyes of the financial community.

Cullinane and its backers sold the public 300,000 shares of Common Stock out of a total issued stock of 1,330,000. Initially offered at $20, the shares subsequently reached a level of $28.

John Cullinane, founder of the company in 1968, said that there had been no significant change in his personal holding and that the move did not signal a change in the company's business. However, being a public company would improve its ability to acquire other software products firms, as well as making it easier to raise additional funds for development.

Subscribers to the issue are understood to include several financial institutions, including firms in West Germany and the UK.

The major part of Cullinane's business comes from sales of IDMS, which last year increased by 71% to $8.7m. Total revenue, including sales of data dictionary and EDP auditing software, rose in the same period from $6.2m to $8.9m.

In addition to direct Cullinane customers for IDMS, numbering about 380 to date, installations have also been made by ICL and DEC, which both sell versions of the DBMS.

Puzzler

THIS Magic Square is arguably the most famous one ever constructed. It appears in Albrecht Durer's classic engraving Melancolia, and includes the year of composition, 1514, in adjacent squares. The Magic Constant in this case is 34.

This week's problem is to determine the very simple formula which relates the "number of squares (n) along one side" of a magic square with the constant for that square. For example, what is the constant for a 16 x 16 magic square (containing the numbers 1 to 256)?

See page 45 for solution.

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

PROGRAMMER NOTES

THE idea of what constitutes a programming language is called into question by a contribution to the May 1978 edition of the British Computer Society's Computer Journal (Volume 21, Number 2).

The article, by W. N. Holmes, of IBM Australia, poses the question "Is APL a programming language?" It argues that programming should be distinguished from calculation — in an occupational sense — and that APL is suited to calculation but not to programming.

"Programming is problem solving, but not just any problems and not just any manner of solving . . . the typical modern program is an item of industrial manufacture . . . created by programmers exerting themselves as members of a team for other people and their work must be done with these other people specifically in mind.

"Discussion of programming is dominated by considerations of methods of manufacture, both in respect of its management and in respect of its procedures. Most larger programming projects adopt a 'top-notch' approach, starting from the overall design and building the program first in broad outline, then in ever greater detail.

"The closest thing to a program in APL is a collection of co-operating defined functions called a workspace. In contrast to programs, workspaces are not usually developed purposefully to a specification.

"In contrast, workspaces are usually developed from some crucial idea, which is expressed and checked out as a quite simple APL function. Alternatively, a group of related ideas is expressed as a collection of simple APL functions.

"In either case a bottom-up approach is used, contrasting with the top-down approach more suited to programming. This bottom-up approach is the essence of APL usage but should be anathema to programmers.

"The APL notation has properties which make it quite unsuitable for programming . . . the most significant being exquisiteness of meaning, irrelevance of data representation and simplicity of sequencing.

"Unlike well written programs, APL function definitions are not fodder for the interested public to browse, rather they are intensely personal and typically esoteric, even when written with style. All this is simply because the notation is concise.

"The major problem which APL faces is the well meaning misguided efforts to make a programming language out of it. If the APL notation were deliberately developed to make it more suitable for calculation and programming languages were more deliberately developed to make them suitable for industrial programming, the usefulness of computing machinery would be greatly enhanced."

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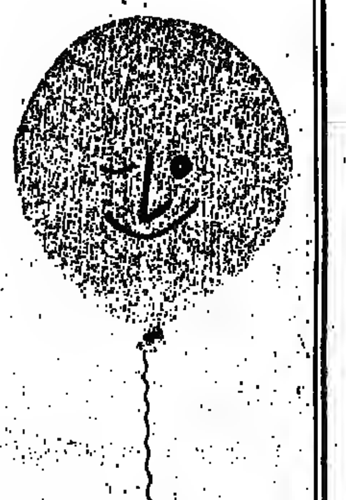

Computer Weekly is holding its third annual Charity Ball. Last year more than 600 people attended what has come to be regarded as the computer industry's big night out.

This year the Ball will again be held under the patronage of the British Computer Society, on the eve of the Society's 21st Birthday.

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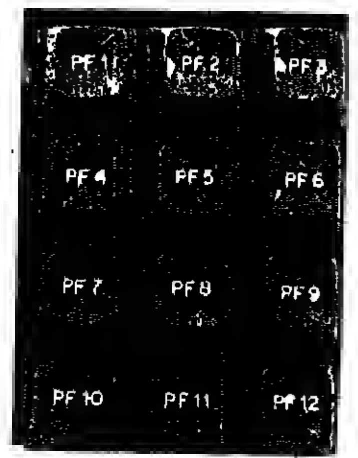
هلا من الأهل

OP SPOT

By Bernard Allen

The two methods of using the program function keys: on the right-hand side of the keyboard are the twelve "physical" PPKs; and across the lower part of the screen is the light-detectable PFK line, numbers 1 to 12.

The use of program function keys



The 12 program function keys

AN operations team leader contacted me in order to discuss the use of Program Function Keys on his system: an IBM 370/138, running under DOS/VS: Release 34.

At his site the 12 PFKs have a purely hardware function — they are used when the system is in RC, or reconfigure mode.

So I contacted an expert on the matter who informed me that DOS/VS would support such a facility, but only with great difficulty.

He pointed out that such a modification would require the writing of a great deal of assembler code, and would make the supervisor non-standard. He added that he would not even consider carrying out such an operation.

This brought to my notice the stark difference between DOS/VS and OS/VS. The latter supports IBM's device-independant display operator console support system, which, thankfully, is abbreviated to DIDOCS. With DIDOCS, the PFKs are of great help to the operator.

Each of the keys is used to initiate frequently used commands so that the operator merely has to press the appropriate PFK, instead of typing the complete command and then pressing "Enter" at the keyboard.

Instead of pressing the PFKs, it is possible to display the PFK numbers in the light-detectable PFK line (see figure 1), and enter the commands by pressing the light pen against the appropriate number or by positioning the cursor and pressing the Enter key.

The PFKs are defined at the time of system generation, but the operator may alter them by use of the K, or Control command (see figure 2).

They are used in either of two modes: non-conversational or conversational. The former will cause the command to enter the system as soon as the key is pressed, while the latter display the command on the screen, giving the operator the opportunity to modify it.

Figure 1
The following control command will cause the PFK numbers to be displayed on the screen:

K D,PFK

Figure 2
This command enables the operator to define the PFKs

K N,PFK=(xx,CMD='text'),CON=Y or N

xx; this is the number of the PFK
text; the command the PFK will initiate
Y or N; "Y" means conversational mode, and "N" signifies non-conversational.

Wages should be linked to output

IT is totally unfair that the wage paid to operations staff is static in nature and therefore in no way reflects the quality or quantity of the work completed by them.

Surely it is time for companies in the computing industry to implement bonus or incentive schemes which link the output of the operations department to the wages of the operators?

Of course some will argue that the shift allowance is the operators' bonus and that on the night shift, at least, they have an incentive — to finish the work quickly in order to get home early.

And admittedly bonus schemes do not really lend themselves to sites where the workload is uniform and where there is a lot of spare machine time.

But at sites where the company sells computer time, including the services of the operators, or where there is a lot of testing and development work, they are applicable. At those installations, the amount of work placed upon the operators will be variable.

Any bonus schemes must be based upon the level of throughput achieved by the staff and should also take the amount of "lost" machine time into consideration. The latter is particularly important in the case of bureaux which provide online services.

In relation to downtime, some may say that hardware and software problems are beyond the scope of operations. That is simply not true.

If the operators are working as a team, it is sometimes possible to anticipate problems and so take action to prevent them.

Under any incentive or bonus scheme, it is possible either to lump the whole operations team together or to put all the shifts in competition, so to speak.

With the first method, the operations manager could set weekly or monthly work targets. Anything in excess of the required amount could then be used as the basis for working out a bonus.

One of the advantages of considering the operations team as a whole is that it will promote co-operation between shifts and the department will become a co-ordinated unit. This, of course, is of great benefit to the company.

However, there might be one shift which does much more work than the others, and if that is the case the combination of the operators into one team is hardly just.

To overcome this problem, the best procedure is this — start a scheme by which the operations department is considered as a whole. If it is evident that one shift regularly does more work than the others, alter the scheme appropriately.

Plain speaking by one of our readers

ONE of the great virtues of certain members of the operations fraternity is the forthright manner in which they put their views across.

This is certainly true of an operator who contacted me in response to an Op Spot based on my visit to the Sunbury installation of BOC Datasolve (CW, July 20).

He began in praise of the piece by saying, "As an IBM operator, I found the comments made about the Amdahl machine running under MVS to be of considerable interest."

However, the praise soon gave way to criticism as he continued. "Unfortunately, as soon as my appetite had been whetted, you stopped talking about the Amdahl machine and concentrated solely on the ICL system."

He then went on to speak adversely both of the subject matter itself and the level of staff I interviewed at the site.

He said, "Apart from leaning too much towards the ICL system, you quoted the manager of the ICL set-up, a shift leader, senior operator and a TP line controller.

"At any site these are the minority. What about the views of the operators and trainees who go to make up the bulk of the operations staff?"

Regarding the subject matter, he had two main areas of complaint:

"Firstly, as an operator, I am not interested in hearing how smoothly the development of their VME/B operating system went.

"Secondly, you went on too much about the theory of how the workload is split up on the system."

He compared the BOC piece with one I did based on a visit to the site of Queen Mary College. He gave me some advice in this regard:

"At Queen Mary College you spoke to all the operations staff and really got behind the scenes. That article gave the flavour of the computer room, so don't change the format."

While I accept several of his comments, I feel that I must reply.

First, a site such as BOC Datasolve's is very complex, with a lot of operations staff. It is just not possible to meet everyone and cover every topic.

Also I must point out that BOC Datasolve went to a lot of trouble arranging for me to speak to the staff featured in the article.

Finally, I have other installation visits in mind for Op Spot. If my critic has comments about these, or anything else which appears in Op Spot I would be glad to hear them.

HINT OF THE WEEK

A faster routine for open-shop testing

THIS week's hint relates to sites which run under OS/VS1 and where an "open shop" method of job testing is employed.

With open shop testing, the programmers have an area where they can submit their work via a designated reader and wait for the output.

Now testing work might have to stop at around 4.30 pm so that the system can be dedicated to the processing of live work.

After that time, all the testing work will have to be taken to the job control section. Later on, a member of the job control section will have to take it to the computer room and, later still, one of the operators will feed it to the system.

All this movement of the work is unnecessary and fails to make use of the operating system's facilities. There is a much better procedure which comprises two steps.

Firstly, about ten minutes or so before the testing work is scheduled to finish, the master console operator must ensure that the reader used by the programmers places its work on the HOLD queue. To do this he should use the following OS/VS1 MODIFY command

F xxx, TYPRUN=HOLD

xxx is the address of the reader being modified in order to place work on the HOLD queue.

Secondly, a person from the job control section should go to the open shop area and take the work from the programmers. He should then "hand-schedule" it (Hint, April 13) and feed it to the system by means of the modified reader. He should also prepare the appropriate documentation and give it to the master console operator.

When it is time for processing of testing work to begin, the master console operator can release the work by means of the RELEASE command.

● £5 is offered for each reader's Hint published

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600 chps printer now sold in UK

A SINGLE-HEADED impact matrix serial printer with a speed of 600 chps — said to be far faster than any similar product currently available — is being manufactured by the US firm Florida Data Corp of Melbourne, Florida. Called the PB600A, the printer is now being sold in the UK by Transworld Optical Business Machines Ltd of Richmond, Surrey, the UK subsidiary of OBM Inc which is the sister company of Florida Data Corp.

The PB600A comes with an 8-needle solenoid-driven print head which operates bi-directionally under the control of a Motorola 6800 microprocessor. Quoted performance figures include a throughput of 240 lpm when printing full 132-character lines and 800 lpm with 20-character lines. A quoted price for the PB600A is $2100 in OEM quantities of 100.

Florida Data Corp also builds a plotter version of the PB600A which plots at a density of 128 dots per inch and which can also form characters from a [illegible] dot matrix.

GEC system for private viewdata

● from front page

automatically for display on viewdata terminals — which are effectively low-cost four-colour video terminals with an integral modem.

Private viewdata services could be set up within companies or closed user groups using the GEC system, and an example the company gives is an hotel, which could get a large number of pages offloaded rapidly from the Prestel computer and then update them locally without further reference to the Prestel machine.

The software took two years to develop, and was written from scratch. It is not based on the Prestel viewdata software, which is written in the proprietary GEC 4000 series Babbage language and belongs to the Post Office.

The cost of a basic editing and bulk update terminal will be about £10,000 over and above the cost of the hardware. The price includes the software and the special keyboard editing display terminal.

● The Post Office has proposed a fee of £1,000 a quarter from organisations providing information for its Prestel service and in addition there would be a charge of £1 per page of information, designed to discourage overbooking of page space.

These proposals have been studied by the Association of Viewdata Information Providers and association chairman John McMillan said, "The Post Office has left room for manoeuvre and is negotiating with interested parties. We do not expect any firm decisions until the end of September."

Plug-compatible emulation of GE 400 due in April

THE plug-compatible emulation of the old GE 400 computer, under development at Telefile Computer Products (CW, April 6), is now set for delivery next April.

The machine, which has a 24-bit word processor, underlines the extent to which bit-slice microprocessors are revolutionising the costs of CPU development. The GE 400 emulation, like Telefile's emulations of the Sigma 9 32-bit machine and the Lockheed MAC 16-bit mini, are built up out of multiple AMD 2901A four-bit bit-slice micros.

The reason for a GE 400 emulation is that there are some 200 GE 400s still running in the US, and about the same number spread over Europe, Canada and Japan, and many of these users want more power without the need to change their software. The new machine will be about four times as fast as the old GE 400, and will have a main memory of up to two Megawords.

Telefile is now planning to move up the GE range, developing upgrades for users of the GE 600 and 6000. The latter was the predecessor of Honeywell's Level 66 and was introduced shortly before GE sold its mainframe business to Honeywell. It runs versions of the GCOS operating system little different from those currently running on the latest Level 66 machines.

Telefile also has plans to attack the Burroughs, Control Data and Hewlett-Packard bases with replacement processors as well as add-on peripherals.

Telefile's turnover in 1977 was $11.6 million, up from $5.9 million the previous year.

Level 61 users call for easier upgrade

USERS of Honeywell Level 61/60 systems in the UK are starting to express concern about having to upgrade to a Level 62 if they want to go over 10K main memory.

A particular cause of discontent is that their counterparts on the Continent can extend main memory to 96K bytes by upgrading to the Level 61/60-2, a machine not available in the UK and which is totally software compatible with the 61/60.

One Level 61/60 user, precision instrument manufacturer Negretti and Zambra, of Aylesbury, Bucks, told Computer Weekly that an upgrade to a Level 62 would involve having to install air conditioning at a cost of £10,000 and software conversion that could work out at between £10,000 and £15,000.

Another cause of anxiety was the possibility that the transaction processing software for Level 62 introduced by Honeywell only a few weeks ago (CW, June 29), would not prove as effective as the transaction software on the Level 61/60 which, unlike the Level 62, was a transaction oriented system.

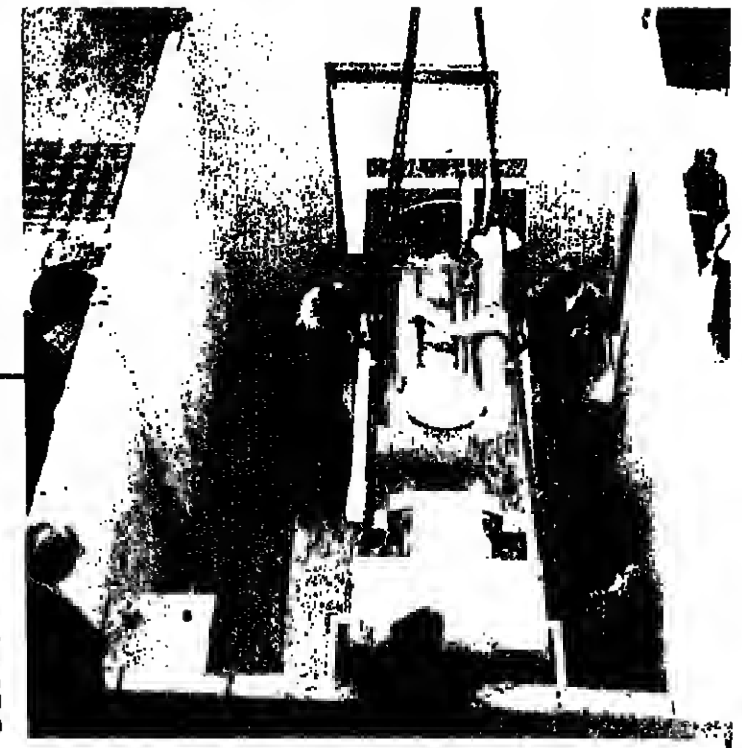
Experts from Honeywell in Italy, where Level 62 is manufactured, have visited several Level 61/60 users in the UK, including Negretti and Zambra, to talk to them about the automatic conversion aids developed by Honeywell to help 61/60 users upgrade to Level 62. Honeywell says that the aids can dramatically reduce software conversion costs but Negretti and Zambra is still not convinced that this would be so in its own case.

Honeywell's main argument is that the Level 62 offers the 61/60 user an upgrade path with far greater potential for systems expansion than the 61/60-2, while costing little more in hardware terms.

Negretti and Zambra conceded that the hardware rental cost of a Level 62 system would not be much greater than the rental on its 61/60 because most of its 61/60 peripherals could be used with a Level 62 processor.

The chairman of the Level 61 users sub group, Malcolm Long, was not prepared to comment on the discontent among 61/60 users in the UK over a lack of an easy upgrade, but he pointed out that the whole matter would be discussed at the next meeting of the group on September 21. Before then he would discuss it with Honeywell.

Touchdown at Green Shield



A BIG computer needs a big emergency back-up power source, and few computers in the NCR catalogue come bigger than the Century 300 mainframe used by the Green Shield Trading Stamp Company.

Green Shield has just moved its computer installation to a new site in Edgware, Middlesex, and at the same time invested £26,000 in a 250kVA generator from Auto-Diesels of nearby Uxbridge. Emergency power can be supplied for 13 hours before the 100-gallon diesel tank needs refilling.

Our picture shows the generator being lowered into its new home — a moment of some relief for Green Shield, because the company estimates that the company loses £100 for every hour that the computer is down. That may not sound much, but Green Shield explains that it only covers such items as salaries for punch-girls made idle by the machine being down, and not any consequential loss.

● Green Shield got the Century 300 in 1976 and is discussing an upgrade with NCR. The logical upgrade would be to one of the powerful Criterion 8500 systems, or even one of the forthcoming 8600 multiprocessors.

NEWS IN BRIEF

Redundancy volunteers

NO union response to the 600 redundancies planned by Plessey (CW, July 13) is expected until after August 18. By then it will be known how many have volunteered for redundancy, and whether any of those who have volunteered would be required in other sections of the Edge Lane plant.

This gives a 10-day extension to the announced 30-day period for volunteers to come forward, since for two weeks the plant had its annual holiday shutdown.

Combs joins Xerox

PRESIDENT of Tymnet, William Combs, has left the company to join Xerox's systems development organisation in El Segundo, Los Angeles. Details of his new post have not yet been made known, except that he will be working on "a new development project."

Olivetti rights

AN online bureau service that can handle jobs like order entry, stock control and invoicing, has been introduced by Telecomputing of Oxford. The service runs on the company's ICL 2950 under the transaction processing system developed by Telecomputing and sold to ICL users all over the world.

WP exhibition

TO promote word processing in the North-West, Stockport College of Technology is staging an exhibition of WP equipment from September 12 to 14, along with a three-day workshop, in cooperation with ICFC Training. Admission is free, and further information can be obtained on 01-940 5650.

Online bureau

ITALY's leading computer systems manufacturer Olivetti is in process of raising some £25 million in a rights issue. Three-quarters of the 40 million shares offered to existing holders were taken up, and the remaining 9.5 million are being offered for sale on the Milan stock exchange.

Data 100 takeover

THE counter-bid by Northern Telecom for control of Data 100 Corp of Minneapolis, Minnesota, has succeeded, and the Canadian company now controls 98% of Data 100's voting stock and a majority of the non-vertible debentures.

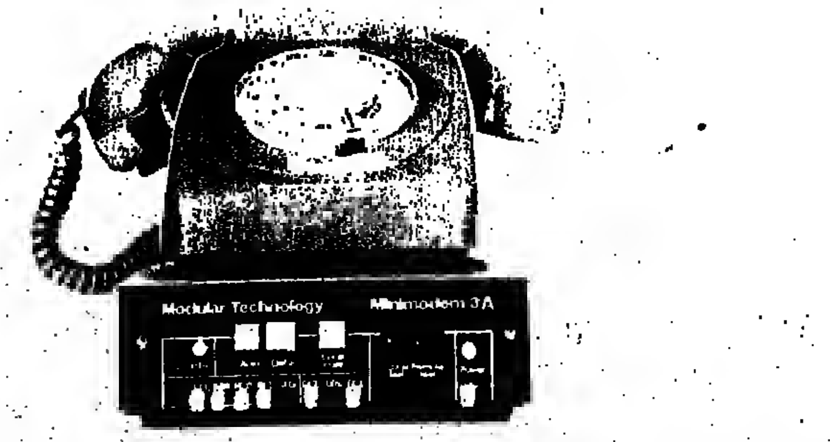
The counter-offer was launched by Northern Telecom, a minority stockholder in Data 100, after aerospace giant McDonnell Douglas' bid for the company earlier this year (CW, May 25). Having built up a strategic stake in the company, it seemed likely that Northern Telecom would seek to acquire control of Data 100.

The bid was made through a subsidiary, Northern Telecom Computers of Nashville, Tennessee. The Canadian company, majority owned by Bell Canada, has been building up its interests in the US data processing market. Last year it acquired Sycor Corp, intelligent display terminal systems manufacturer of Ann Arbor, Michigan.

Exporter gets MSX

MESSAGE switching equipment from Case of Rickmansworth has replaced 12 telex machines at Tube Investments Export in Birmingham. The MSX system, costing £75,000, can re-try engaged numbers, check for correct answer-back and send the same message to a list of addresses.

IF YOU WANT TO TALK TO A COMPUTER TALK TO US FIRST



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PEOPLE

Prizes for three after systems course

TEN students gained NCC Certificates in Systems Analysis this year after completing the one-year part-time course at Watford College. In addition, three were awarded special prizes.

The award for the best all-rounder, donated by Baric Computing Services of Letchworth, went to Keith Detworth, who was working as a social scientist with the DoE's Building Research Station at Garston while he was following the course, but who is now a market analyst with NCR. Baric is a subsidiary of ICL.

Our picture shows him receiving his award from Mr A. Baston, a member of the Management Studies Advisory Committee.

The local branch of the British Institute of Management made the award for progress in management development. This was won by Bernlee Cohen, who took the systems analysis course as part of the complementary studies in the full-time course in Business which she was following at Watford. She is now employed as a DP manager.

The prize for software went to Peter Medlar, a systems analyst at King and Hutchins. It was donated by F International.

Peter Tindell, previously a sales engineer with IDES, has joined Applied Industrial Refrigeration Sales Ltd in the same capacity.

Tindell Jemmet Sizemore Featherstone

Philip Jemmet has become sales executive with Hoechst for the Goldbach range of modular flooring systems for computer rooms. Previously he was responsible for sales of complete package computer rooms with the Computer World Trade Group.

Alan Sizemore, David Chadwick, Ray Clarke and Cliff Teasdale have joined the Interdata division of Perkin-Elmer Data Systems as sales executives. Sizemore, responsible for the West Midlands, was previously a sales executive with ICL Midlands; Chadwick, who takes the North-West of England and West Scotland, was a sales executive with Cybernet Timesharing.

The East Midlands area will be the responsibility of Ray Clarke, who was formerly a sales executive with Datagraphics, and Cliff Teasdale, who will be responsible for the North-East of England and East Scotland, was also a sales executive with Cybernet.

Formerly a systems programmer with ICI Organics, James Featherstone joins Perkin-Elmer as a regional support analyst for the North of England.

Ian Smith, formerly manager at Decca's radar service division, has become head of the reorganised field service division at Sintrom Electronics.

Michael Dudley has become director of leasing and broking with Itel International and will be responsible for the monitoring and promotion of leasing in Europe and the remarketing of Itel's CPU portfolio. Previously he was sales manager of Itel UK.

David Harris-White and Pam Quinlan have joined the training division of BIS Applied Systems. Harris-White, who will initially specialise in database and real time courses, was previously database analyst with Parker Pen Co; Quinlan, who was most recently with Management and Executive Selection where she specialised in recruiting computer lecturers, will lecture on BIS courses and organise one-day conferences.

Roger Evans of Computer People Limited, CPL, has been promoted from managing consultant to general manager. Robin Shuler and Janet Chilvers have become recruitment consultants with CPL.

Quinlan Dudley Newman Atherton

Bernard Atherton has been appointed divisional general manager of the management services department at Barclays Bank. Formerly he was assistant general manager of the department.

John Newman has joined Quest Automation as systems manager for Datapad. Most recently he was a military adviser in the computing, guided weapons and assessment division at the Royal Signals and Radar Establishment a Malvern.

Ian Harry has been appointed product specialist with special responsibility for component test house and semiconductor manufacturer sales, with Microsystem Services. Formerly he was an area sales manager with International Rectifiers.

Duroyus Multvala joins Basic Timesharing as UK systems manager, from Datasnab where he was program manager.

Soccer

Summer Computer League results and tables

Following good wins over Datascene and Rank Xerox, Gryphon are now the leaders of Division I. However both Jadpu and SIA have games in hand and are still in contention

Results

Division I

Jadpu 4, Comshare 0
Rank Xerox 1, Gryphon 5
Datascene 1, Gryphon 3

Division II

ICL 1, Altergo 3
Datasolve (City) 1, Atkins 4
John Lewis 0, Altergo 1
Altergo 3, Atkins 2
Atkins 1, Datasolve (City) 0

Division III

Xerox (London) 1, 3M 2

Division IV

Computer Weekly 0, C.J. Bees 2
Bunzl DS 2, C.J. Bees 0
UCSL 1, Wellorax 6

Division V

CDC 0, Sherwood C.C 2
Haskyns 3, Jadpu 'A' 3
Allen CS 6, CDC 5

Tables

Division I

	P	W	L	D	F	A	P
Gryphon	6	5	0	1	20	6	11
SIA	3	2	0	1	7	3	5
Jadpu	3	2	1	0	12	6	4
Datascene	5	1	3	1	9	16	3
Rank Xerox	4	0	3	1	8	18	1
Comshare	3	0	3	0	2	9	0

Division II

Altorga	4	3	0	1	9	5	7
Atkins	5	3	2	0	18	6	6
Datasolve	6	2	2	2	12	14	6
John Lewis	4	1	1	2	10	8	4
ICL	5	1	3	1	7	18	3
Lambeth	4	1	3	0	8	13	2

Division III

3M	4	2	2	0	12	8	6
Datasolve (WE)	3	2	1	0	6	4	5
JPC Victoria	4	1	1	2	21	12	3
Gill & Dullus	1	1	0	0	4	2	2
Airfix	1	0	0	1	2	6	0
Xerox	3	0	0	3	5	19	0

Division IV

Targa	4	3	0	1	38	9	6
Wellorax	5	3	0	2	13	20	6
Bunzl DS	5	2	1	2	9	8	5
C.J. Bees	5	2	0	3	9	14	4
Comp Wkly	3	1	1	1	5	5	3
UCSL	4	1	0	3	5	23	2

Division V

Sharwood CC	3	3	0	0	13	6	6
CDC	4	2	1	1	14	10	5
Allen CS	3	1	1	1	20	10	3
Hoskyns	3	0	1	2	5	20	1
Jadpu 'B'	2	0	0	2	5	12	0

COURSES

THE University of Salford is offering several short courses on subjects in the computing field this year. They include courses on microprocessors, microcomputers and their applications; a first course in Cobol training; and computer programming using Basic for teachers and lecturers. For details apply to the Administrative Assistant (Short Courses), The University of Salford, Salford, M5 4WT. Tel: 061-736 5843.

NUMERICAL Computation is the subject of a one-year Open University course for which no qualifications are required but a knowledge of calculus and matrix theory is necessary. Teaching is carried out through correspondence texts and TV and radio programmes. The application period is open until mid-October. For further details contact the Associate Student Central Office, The Open University, P.O. Box 76, Walton Hall, Milton Keynes MK7 6AN.

AN intensive course for designers and engineering managers on the design of microprocessor-based systems has been organised by Prodex and will be held in mid-November in Bristol; and then successively in London, Manchester and Birmingham. For details contact Prodex (Seminars) Ltd, 79 High Street, Tunbridge Wells, Kent TN1 1XZ, tel: Tunbridge Wells (0892) 39864.

USING small computers in engineering, Choosing a microprocessor, and Boundary element method in electrical engineering are the titles of three courses organised by Computational Mechanics and scheduled for September 18-19, October 25-26 and December 12-14 respectively. All will take place in Southampton. For details contact Courses Dept, Computational Mechanics Ltd, 8 Cranbury Place, Southampton SO2 0LG. Tel: (0703) 21397.

THREE courses in computer-aided circuit design are offered by the Department of Electrical Engineering at Imperial College, London this autumn term. They are entitled Optimisation (September 11), Sensitivity analysis (November 1-2) and Numerical methods (December 13-14). Further information may be obtained from Joan Jeffery, tel: 01-589 5111, ext 1470.

A TRAINING course entitled New systems design technology, offered by Infotech, will be presented by Tom Gilb on October 23-27 in London. It presents a new methodology for system planning, system design project management and computerware perception. For further details telephone Sharon Ross on Maidenhead (0628) 35031.

THE French consultancy Sligos is offering several courses and seminars in DP management during the fourth quarter of 1978. The courses will be given in French. For details contact Agnes Olivier, SLIGOS, 91 rue Jean-Jaurès, 92807 Puteaux, tel: 776-42-42, poste 486.

AIMED at programmers who have learned a computer language and want to improve their programming techniques, the course from BIS Applied Systems on Improving programmer productivity is due to be held on September 11-12 at the Kensington Palace Hotel, London. Details of this and other courses from Doreen Pavlou, Course Registrar, BIS Applied Systems Ltd, York House, 199 Westminster Bridge Road, London SE1 7UT. Tel: 01-633 0866.

DIARY

AUGUST 21-24
Operational data security workshop. Operational Data Security Corp, City University, London EC1. [illegible]

AUGUST 21-25
Cybernetics and systems fourth international congress. World Organisation of General Systems and Cybernetics, Amsterdam. Details Dr J. Rose, College of Technology, Blackburn. [illegible]

AUGUST 22-25
Conference on parallel processing. IEEE Computer Society/Wayne State University, Bellaire, Michigan, USA.

AUGUST 23
Meeting. VM UK and Ireland Users Group, Maidenhead. Details from Iain Stinson [illegible]

AUGUST 23-25
Siggraph 78, fifth conference on computer graphics and interactive techniques. Association for Computing Machinery, Atlanta, Georgia, USA.

AUGUST 28-SEPTEMBER 1
Eighth Australian Computer Conference, Australian Computer Society, Canberra.

AUGUST 29
Jackson design technique, management tutorial. Marcus Bromberger, Dept of Computer Science, University of Strathclyde, Glasgow. [illegible] the Continuing Education Office of the University. [illegible]

SEPTEMBER 4-5
Medical Informatics Europe, congress. European Federation for Medical Computing, Cambridge. [illegible]

SEPTEMBER 5-8
Compcon Fall 78. IEEE Computer Society, Washington, DC.

SEPTEMBER 7
People in computing, seminar. National Computing Centre, Riccarton Campus, Heriot-Watt University, Edinburgh.

SEPTEMBER 11-13
Non-invasive cardiovascular measurements conference. NASA/Stanford University, Stanford, California.

SEPTEMBER 12
Computer programs for project control, seminar. Association of Project Managers, Waldorf Hotel, London WC2. [illegible]

SEPTEMBER 12-14
Computers and the unions. Clive Jenkins. BCS 1978 Lecture Series, London School of Economics, London WC2. [illegible]

SEPTEMBER 13-14
[illegible]

SEPTEMBER 13-15
Very Large Databases, conference. IEEE Computer Society/ACM/SIGMIS, Berlin.

SEPTEMBER 18-22
Jackson design technique, workshop. Marcus Bromberger, Dept of Computer Science, University of Strathclyde, Glasgow. [illegible] Details from the Continuing Education Office at the University. Tel: 041-552 4400, ext 2132.

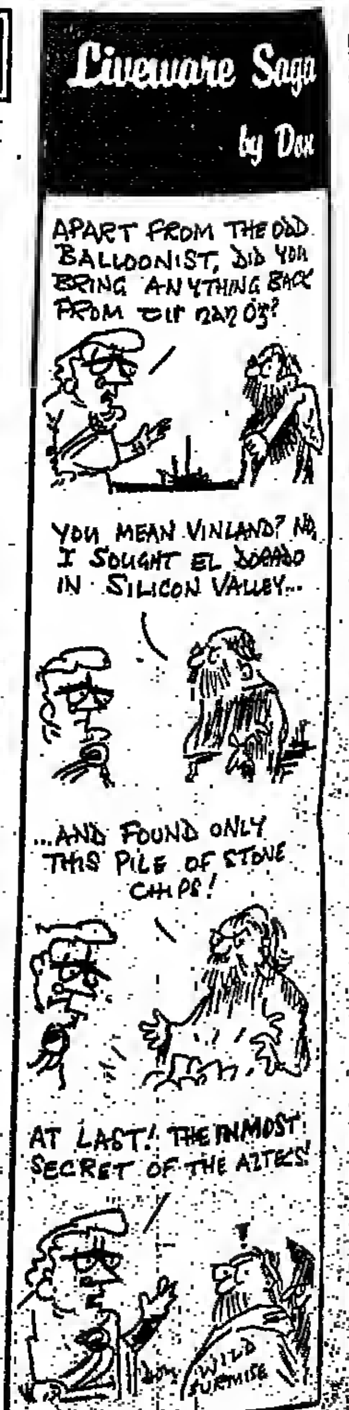
SEPTEMBER 19
Costing cost control accepted, seminar. Association of Project Managers/Association of Cost Engineers, Belfry Hotel, Manchester. Details M. H. Drake, 061-236 2011.

SEPTEMBER 19-21
CAD/CAM, computer-aided design and manufacturing conference and exhibition. Computer and Automated Systems Association, Los Angeles.

SEPTEMBER 20
VME/K interest group meeting. 2900 User Group, National Liberal Club, London SW1.

SEPTEMBER 21-23
Symposium on interactive techniques in computer-aided design. IEEE Computer Society, Bologna, Italy.

SEPTEMBER 26-28
International computer communication conference, ICCC 78. International Council for Computer Communication, Kyoto, Japan.



PERIPHERALS AND TERMINALS

Programmer power a key component in editing CRT terminals

The scope and power of peripherals and terminals for computer systems are continually being improved. As new applications are developed, equipment is designed or adapted to provide the necessary facilities. In this special section three aspects of this market are discussed. Mike Kitching of Memorex looks at the role of the PCMs; John Macdonald of Honeywell explains the benefits of high speed printing techniques; and in this first article Doug Martin, sales manager, Europe, of Perkin Elmer Data Systems Terminals Division, shows how the design of communications systems can be enhanced by the use of the sophisticated terminals that are now available.

By Doug Martin

MOST articles about the planning, analysis, and design of computer/terminal data communications systems tend to focus on response time, transmission time, line contention, or queueing theories. While these areas are important, the system designer can often effect much greater savings in time and money when additional time is devoted to the selection of the communication system's primary I/O device — the terminal.

Recognising the significant impact of the human interface in any communications system, manufacturers of communications peripherals are devoting more time and effort to the human engineering and programmer control aspects of today's terminals.

The results of these efforts are operator and programmer-oriented products that achieve significant savings in time and money through improved operator productivity and reduced host computer loading.

Simultaneously with the improvements brought about by this commitment, manufacturers of terminals see prices of their products dropping and capabilities expanding with the increasing use of LSI technology and microprocessors. A good example of these changes is the editing CRT terminal as used for online database accessing and updating operations.

In the traditional interactive terminal environment, using an editing terminal can result in real savings, reduced operator fatigue, and optimal use of system resources. Proper selection and use of the best editing terminal's many features is the key to these improvements and savings. Some of these more important features and their uses are described here.

An editing terminal can eliminate the extensive compare operations that are usually required to update operations. This helps to minimise the loading imposed on the host computer. The necessary feature is a modified data tag capability, a method of selecting for transmission to the host only those fields whose contents have been changed by the operator. This saves host time otherwise required to receive a full 1920 character screen and compare it with the screen image originally sent down to the terminal.

Another feature is the protected field which enables the programmer to specify which data cannot be changed by the operator. This allows information which is needed for several successive operations, such as column headings and graphic representations of forms, to be written down once only, again saving operator time, communications line loading and host loading.

Since the terminal operator is the weakest link in the communications network, as far as errors are concerned, complete control of what happens on the screen is very important to ensure accuracy. If the programmer knows what is happening at the screen at all times, he can lead the operator by the hand and so reduce the errors.

Where the operator transmits one or more lines of data instead of the entire screen, the ability to read the cursor location, and then move it vertically or horizontally to the correct line and column, enables the programmer to position the cursor to the next point where operator action is required. This saves operator time. When protected fields cannot be used for some reason, this positioning prevents costly mistakes.

A simple feature such as being able to set tab stops at any position of a line allows the programmer greater latitude in programming than do the fixed tabs common on many editing terminals.

Providing the programmer with complete terminal status information, such as parity error, printer error/busy, keyboard locked and keyboard mode control switch settings, prevents needless errors, software upsets and service calls. Complete access to full terminal status information provides the programmer with more control over the screen. It allows simple error messages, such as "printer not ready", to be displayed for the operator, avoiding delays which may otherwise be encountered in these situations.

Graphic capability enables the programmer to portray familiar forms on the screen. This tool makes the operator's job easier and helps reduce errors, especially by new operators.

Defining graphics as "protected" fields, in combination with a "clear-unprotected only" feature, assures retention of the graphic form for re-use, without requiring it to be sent down from the host again.

Graphics also break the visual monotony of the screen and allow the programmer to highlight fields of particular interest by use of the CRT's blinking, brightness and inverse video features.

The disparity between software and hardware development costs continues to widen. An extremely useful tool for debugging new software systems is the transparent mode, which enables the programmer quickly to recognise the causes of problems during program development. In the transparent mode, all characters including control characters are displayed, and the programmer easily verifies exactly what was transmitted to the terminal.

Some editing terminals have function keys. The programmer assigns various meanings to the unique ASCII codes which the terminal transmits when these keys are depressed. Based upon the transmitted function codes, the programmer causes specific programs to be loaded and executed.

With function keys, it takes only a single key depression to call a complex function — a significant saving in time and accuracy compared with entering multiple character messages to call the function by name.

Whatever the programmer

● Turn to page 12

The low-cost 1200 Video Display Unit is a high-quality editing terminal with line drawing capabilities. It has been designed to ensure low operator fatigue and high throughput.

PCMs fulfil a real need in the industry

By Mike Kitching

PCMs have started a trend which has had an overall beneficial effect on the industry, and DP managers have gained a degree of independence from mainframe manufacturers which they have welcomed above all else. This, says Mike Kitching, who was appointed managing director of Memorex UK following the merger with Telex UK at the beginning of the year, He had been managing director of the latter since April, 1976. Kitching was previously marketing director of ITT Data Systems.

THE nature of the question, "Why PCM?" is now nearly academic. Most computer users have been exposed to the many arguments for and against, and the growth of installations with foreign peripherals is reaching sizeable proportions. The industry, however, is a long way from a true revolution and mainframe manufacturers still largely dominate the direction and philosophy of data processing, although PCMs have had an important effect on product technology, commercial and pricing practices.

It must also be said that the bulk of PCMs have concentrated on the IBM installed base, by far the most lucrative and wide market segment in the industry. Users who have not carefully considered the possibility of utilising plug-compatible peripherals may benefit from a review of PCM development and the salient elements contributing to their growing acceptance.

The introduction of System 350 heralded the principle of compatibility, including upward compatibility of application programs, a standard method of operation under a microprogrammed operating system, and data compatibility through a standard peripheral equipment interface within the operating system. Most of these concepts, incidentally, were developed and demonstrated by other manufacturers some years earlier.

With compatibility the PCM industry also began. Through a combination of technological improvements and keener prices, a combination which still holds today, users were for the first time offered an alternative to the total system package offered by mainframe makers. PCMs forced the introduction of single capstan tape drives and "voice-coil" motor-operated disc drives, developments which were being held back largely for marketing considerations such as product life, product differentiation and pricing.

The threat posed by the PCMs was countered and is still being countered with shifts in technology, changes in interfaces, pricing policies aimed at competing with PCMs, and veiled and overt suggestions that the introduction of foreign peripherals would bring about dire consequences — withdrawal of system responsibility and system support, system failure, contractual invalidations, incompatibility, etc.

Today PCMs are active in every peripheral area including media products, and the mixed vendor environment is widely accepted. Memorex in the UK, for example, are present in over 50% of the IBM installations in their area of operation. Early fears about reliability, field engineering support and compatibility have vanished.

PCMs, furthermore, continue to offer higher performance characteristics, faster delivery and a generally more flexible approach to user needs, including contractual terms. Their knowledge and application to total systems requirements goes well beyond the mere sphere of plug-to-plug replacements. System 360 users, typically, were able to extend their CPUs' life expectancy through advances introduced by PCMs.

The immediate future will probably consist of activities of the same type, with plug-compatibility, higher performance and lower cost. However, with the increasing strength of PCMs, products will be introduced which will be more than simply functional replacements.

For example, non-IBM communications controllers are now available that perform some of the functions of TCAM, but still interface to an IBM 370 in a normal manner. In the near future, we can expect high-speed, solid-state memories operating on buffers between disc storage and the main memory, with capacities in the 100 Megabyte range.

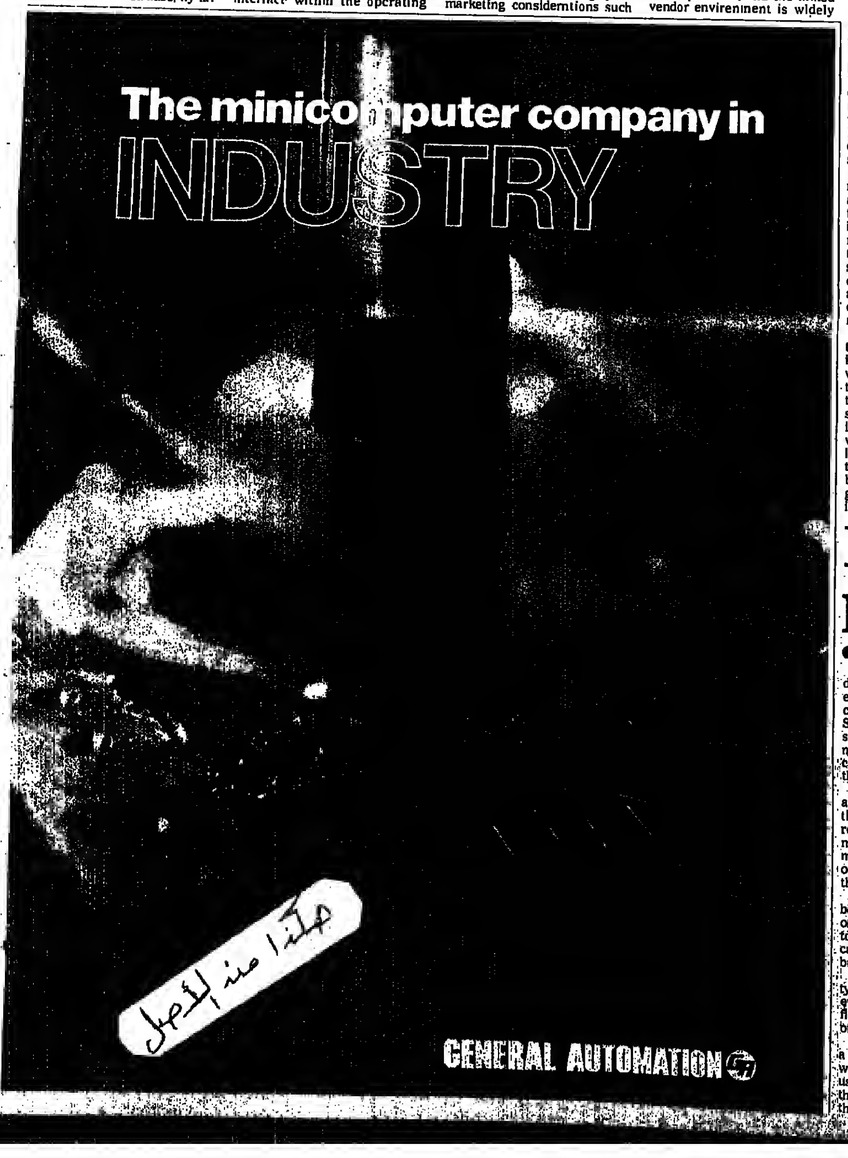
Why, then, PCMs? Essentially, because they fulfil a need in the data processing industry which no one else has attempted to address. They have entered the market-place with the twin spearheads of innovation and lower prices. The trail-blazers who accepted their wares were instrumental in giving impetus to a trend which has since benefited the industry in general, with the end-users gaining the advantage of technology at a more reasonable cost.

PCMs were also responsible for the changes which mainframe manufacturers were compelled to bring about in the way systems are sold or leased. The veneer of mystique associated with computer systems purchase has mainly disappeared and users now have a choice — an extremely valuable asset when dealing with the monoliths of the industry.

PCMs, therefore, may be said to have started a trend which has had an overall beneficial effect. Great causes, however, are not the stuff of commerce: commercial success is measured in sales. DP managers who opted for plug-compatible machines did so on a purely economic and operational basis, and will continue to do so only as long as PCMs can demonstrate value for money.

In the process, DP managers have gained a degree of independence from mainframe manufacturers which they have welcomed above all else. This independence — this alternative — is now the keyword to the marketing approach of the alternative suppliers.

The DP manager knows that the mainframe and PCM supplier have learnt to live together safely in his computer room.



Programmer power

● From page 11

does to make the terminal operator's job easier reduces the chance of errors creeping in. Some editing terminals not only allow the programmer to define numeric-only fields, but also cause the keyboard to lock if that format is violated.

Since groups of data which are meaningful in the application sense probably do not correspond exactly with one or more lines on the CRT screen, more efficient use can be made of the screen's limited capacity through the message approach.

Some editing terminals may be used either conversationally, or in block mode, again adding to the range of applications they can support and help out in debugging.

Other useful transmission types include the ability to send everything, to send just those fields containing modified data, or to send just unprotected data.

The Request-To-Send mode is a big help to the system designer who wants to make optimum use of the host main memory. In this mode the terminal sends a three-character code to the host when any send key is depressed. This informs the program that data is ready for transmission and specifies which send key (or function key) has been used by the operator. After identifying the depressed send key, the program allocates the necessary storage and issues a "read" code to initiate transmission of the data.

The Request-To-Send mode can be used with any of the transmission types. In addition, as part of the "read," the host is free to ignore the operator's choice of send key and read everything, modified data only or protected data only, by line, by page or by message.

In this mode of operation, the host is in control, not the terminal operator. The host need not read a terminal until it is convenient to do so, and until it has available a buffer for the transmission. The buffer can be much smaller than a full page if the send line or send message capabilities are used. These main memory and time savings are especially important to the growing numbers of minis and even micros finding their way into small-multi-terminal on-line systems.

Choice of high-speed printing technologies

By John Macdonald

Honeywell Information Systems believes that the future of high speed printing lies with electrographic processes. Other companies like IBM and Xerox disagree, and have plumped for electrophotographic techniques. John Macdonald, PPS director of marketing at Honeywell Information Systems, says that the companies which prove to have taken the wrong route will have the difficult task of catching up in an unfamiliar technology.

WHAT is meant by high-speed printing, a term so far unfamiliar in many British computer installations? Essentially it is printing with non-impact output devices at rates in excess of about 3,000 lines a minute.

To do this requires a complete break with the impact printing techniques found in the typical line printer, which has a top speed of not much more than 2,000 lines a minute.

The quantum leap through to these new high speeds, which can reach up to 18,000 lines per minute and will rise higher, involves a switch in technologies. But which technologies?

Honeywell Information Systems believes the future lies with electrographic processes. Companies like IBM and Xerox disagree. They have plumped for electrophotographic techniques.

The companies which prove to have taken the wrong route will have the difficult task of catching up in an unfamiliar technology.

The argument between the two types of system falls into three main areas — cost, technology and future development. And the fundamental differences in each of the electrographic and electrophotographic techniques give users a choice of following very different routes.

The basic technological difference is that manufacturers of electrographic equipment have chosen to share the technology of the process between the equipment and ordinary-size dielectric paper, whereas electrophotographic equipment extends the familiar photocopying techniques into HSP (High-Speed Printing) using traditional computer print-out paper.

The differences in the technologies can best be illustrated by describing two typical systems. Take first an electrophetographic system producing its output on computer print-out paper.

Although this is an extension of photocopying technology, how do you digitise a photocopying process? The answer is by using a laser beam.

A photoconductive drum is initially charged evenly over its entire surface. A xenon flash strobe projects an instantaneous image of the film negative of the required form onto the photoconductive drum. The high intensity light has the effect of imprinting an electrostatic image on the surface of the drum.

Variable data is then superimposed on the forms image by the laser beam. This is reflected from a rotating multifaceted mirror and forms a pinpoint of light on the drum, the pinpoint being scanned across the drum surface by the rotation of the mirror. Each facet of the mirror represents one scan.

The laser beam is interrupted electronically, thus giving a modulated scan of light onto the photoconductive surface in a manner similar to that of an electron beam scanning the surface of a video screen.

Dry ink toner is applied to the drum surface at a further position in the machine to develop an image before the image is applied to the plain paper. It is all a fairly complex piece of electro-mechanical technology.

An electrographic system will work in a completely different way. To begin with, the paper passes right through the equipment on a roll, and at various stages the printing takes place.

The first stage the paper passes is a forms cylinder where forms are created, thus eliminating the need for pre-printed stationery in most applications.

The latent forms image, which cannot be seen yet, then passes across the print head where the variable print data from the computer output is added by electrode styli which produce a dot matrix of 200 dots to the inch horizontally and vertically. This means that a wide variety of print styles and sizes can be produced.

The paper then passes through the toner station where liquid ink is applied to a roller. The charged ink particles adhere to the oppositely charged areas of the paper and develop an image. The paper is then dried, and passes on through perforating, punching and stacking processes.

The secret of the success of this method is, of course, the special dielectric paper. Strides in paper technology during the last few years have made this a mere viable proposition.

But it still upsets the cost element of the choice, and provides potential users with something of a dilemma. It could be said that for users the basic argument revolves around the cost rather than the technology.

Whereas the capital cost of electrophotographic printing systems is significantly higher than that of electrographic systems, paper for, and therefore running costs of, electrographic systems are higher.

For instance, typically, Honeywell would charge around £150,000 for a medium capacity configuration in its range of Page Printing Systems, and reckons that equivalent electrophotographic equipment would cost about £230,000.

However, paper costs on the PPS are at the moment higher. They have been as much as 70% higher than plain paper costs on electrophotographic machines. The practical effect of that was that once a user hit the two million pages a year mark on his machine, the cost advantage of the equipment was wiped out in running costs.

Changes in paper costs are, however, altering that vital equation. While the cost of plain paper for electrophotographic machines is likely to double in the next two or three years, dielectric paper will rise at a much more sedate rate, which could reduce the differential between the two to as little as 15%.

This could still create higher running costs on electrographic machines at the highest throughput levels, but it changes the arithmetic in electrographic's favour lower down the scale and, as the difference in paper cost narrows, so the electrographic technique will become economic even at the higher throughput levels.

However, the running battle between the technologies is likely to develop some interesting twists during the next two or three years. Because there are two different technologies, attempts by rival manufacturers to improve the performance of their machines will involve radically different approaches.

This, in turn, could affect the capital cost of the rival equipment to varying degrees, again changing the sums which users will have to do.

Take just one development which is already being forecast — double-sided printing. With electrographic equipment the task of introducing this is comparatively straightforward because much of the technology is in the paper. Essentially, double-sided coated paper has to be introduced — there are certain problems about this which are currently being solved — and fairly simple changes made to the drums and dot matrices in the machine.

With electrophotographic equipment, because plain paper is being used, the printing mechanism within the equipment will need to be duplicated.

So users have to make a carefully judged decision, particularly if they are looking ahead. But there is little doubt that high-speed printing systems will be a major growth area of the 1980s.

And users will have to learn to look outside the traditional data processing budget for the kind of cash savings they can produce. For instance, the ability to sort output automatically by postcode is part of the printing operation means that savings can be achieved in bulk postage rates.

Other savings are made by computerising jobs which previously would not be computerised because the quality of the print was inadequate, for instance, direct mail shots.

The fact that the end-product from the electrographic technique can be an A4 size printed page rather than the traditional unwieldy print-out paper would mean greater savings and convenience in storage and filing.

Finally, there are major savings in the operational costs of post and printing activities.

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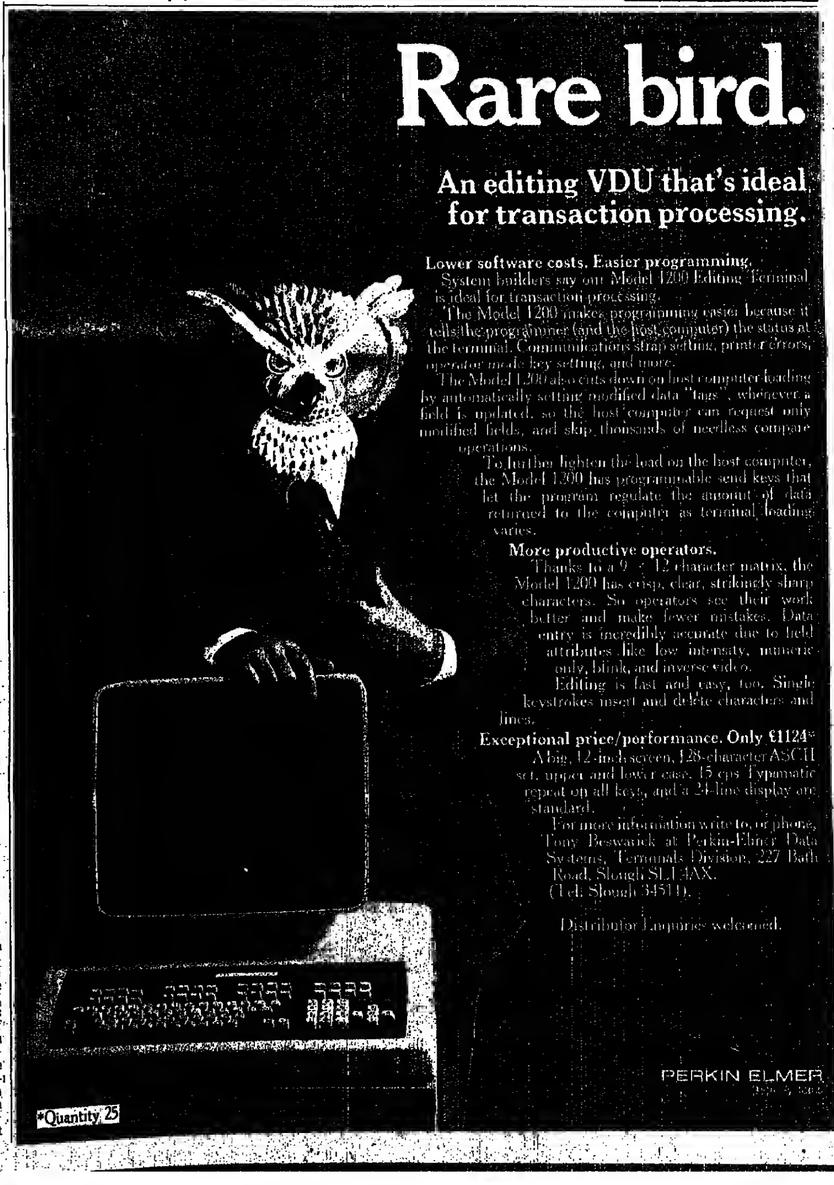

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PERKIN ELMER

DPMs in the US reach for the top

THE growing importance of computers to the running of a business has led to a significant increase in the status and salaries of DP managers in the US, with some DPMs commanding salaries of up to $135,000.

A recent survey in the UK by BIS Applied Systems showed that UK DP managers were being hit by successive pay restraint policies which have eroded differentials between management and their senior staff (CW, June 1).

According to the Wall Street Journal, however, the salary gap in the US between DP managers and their staff is increasing, partly as a reflection of the increased status of DP management within the corporate structure.

While salaries for most DP staff have risen by about 4.5% annually since 1971, those at the top of the DP ladder have been increasing at an annual rate of 7.5% with the average salary of a DP manager rising from $23,765 to $36,606 in the seven years.

But the Wall Street Journal says that in some cases the rewards are far higher, with three positions recently filled at salaries of from $80,000 to $135,000. In addition, DP managers are likely to be in line for a variety of fringe benefits, such as bonuses and stock options.

Dependence on computer systems has also led companies to raise the status of DPMs.

This is leading either to the bringing in of top executives to take responsibility for DP or to DP executives moving into higher ranks.

The president of a New York consultancy, Associates for Human Resource Development, is reported as saying, "In the past, data processing was a dead end and a hungry executive had to jump ship to another department before he could land a vice-presidential spot. Now, such vice-presidents are common. We are even seeing the beginnings of empire building, where the data processing executives try to acquire as many other parts of the company as possible."

● The way DP managers can equip themselves with communications skills to help improve relationships with users, and to take advantage of the increasing importance of DP, will be the main subject of a workshop "Successful User Relations" being organised by the Institute of Data Processing Management and Computer Weekly.

Clerical methods were very different in 1878, when the Royal Army Pay Corps was set up to handle soldiers' pay. So were uniforms, as can be seen from this picture of a soldier (right) in the undress uniform of a Pay Corps lieutenant, circa 1878.

Now, in the Pay Corps' centenary year, CMC data entry systems are used in place of manual methods and the Army is even encouraging soldiers to receive their pay by bank transfer, in place of the weekly Pay Parade held until recently at every Army depot.

Bank systems 'can help spot fraud'

COMPUTER systems in banks should incorporate automatic checks and alarms to help spot potential fraud, says Ryal Poppa, chairman of Pertec, the Californian minicomputer maker. "The data processing industry has the capabilities to assist in the prevention of billking schemes that have been around for decades."

Most white-collar crime involves withdrawels of money from bank accounts and "savings and loan institutions," Poppa therefore recommends that online transaction systems should include routines which warn the cashier automatically every time an unusual transaction is requested — for instance, when most or all of the funds are being withdrawn from a relatively inactive account. The cashier would then, before proceeding, consult a bank officer who could call the police if fraud was suspected.

Honeywell in Japan

AS planned (CW, July 27), Honeywell has established a new Japanese subsidiary, Honeywell Information Systems Japan Inc, in which it holds 80% of the equity. The other 20% is held by MOM, Mitsubishi Office Machinery, which has sold some Honeywell products in Japan since 1970.

The new company will concentrate principally on the Level 61 line from France, but will also sell some imported Level 64 and Level 66 systems.

Although systems based on the Honeywell Level 66 line are built under licence in Japan and marketed by NTIS, NEC-Toshiba Information Systems, as the top end machines in the Aboe 77 line, about 10 Honeywell 6000s were sold in Japan by MOM, mainly to agricultural co-operatives, and these are due for an upgrade and are likely to be replaced by Level 66 machines built in Phoenix, Arizona, and sold by the new Honeywell company.

Burroughs turns in record results

BUSINESS continues to boom in the US computer industry as, following strong figures from Honeywell, Control Data and NCR (CW, July 27), Burrough has turned in record figures for the first six months of 1978.

Second quarter net profit rose 16% to $57.5 million on turnover up 15% at $594 million.

CSC in $225m Saudi deal

AN enormous contract, expected to be worth over $225 million over five years, will shortly be negotiated by Computer Sciences Corp in Saudi Arabia.

The Saudi Ministry of the Interior wants a nationwide computer information system, and has chosen Computer Sciences to negotiate the contract. Detailed discussions will begin in September, after the Muslim Holy Month of Ramadan.

The Saudis went a complete turnkey system with central system, nationwide communications network and terminals, and in addition to expediting the processing of visitors — up to 300,000 a day in the pilgrimage season — the system is to handle vehicle registration, issuing of driving licences and accounting functions such as inventory control for the Interior Ministry.

The state of the negotiations is such that Computer Sciences spokesman in California was unable to make any comment on hardware likely to be used, but the contract could be good news for Univac, because Computer Sciences has a large body of system and application software which runs on Univac 1100 mainframes for the Infonet time sharing service. However, the company has experience on a wide variety of hardware with such applications as the LACES imporia clearance system at Heathrow Airport, which runs on ICL System 4 mainframes.

It is not yet decided what kind of communications network will be used; Scicon is using radio for a comparable data network in Saudi Arabia.

Modcomp profit doubles

WITH record second quarter turnover and profit, the recovery at the Florida-based minimaker, Modcomp, appears complete.

Profit for the quarter rose 85% to $1.2 million on turnover up 16% at $15.8 million. For the first six months of 1978, profit more than doubled at $2.3 million on turnover up about 20% at $30.5 million.

Modcomp has also announced UK prices for the new Classic 7870 processor (CW, August 3).

A 7870 with 256K-words of main memory, display, line printer and 10 Megabytes on disc costs £68,034.

Features of the high-performance 7870 include five concurrent memory access paths, and main memory extendable to two Megawords.

There are two memory access paths to memory, one for the instruction pipeline and the other for the operand pipeline, and each can be loaded with up to four 16-bit memory words and up to four pre-fetched instruction words.

BC/7 gains ground in UK

ORDERS worth over £650,000 have been placed for the Univac BC/7 small business computer in the four months since its UK launch in April. There are 25 of the Intel 8080-driven machines now installed or on order, and Univac's advertising campaign for the machine has brought in some 1,700 inquiries.

The UK is currently the leading European market for the machine, although France and Germany are close behind, each with about 20 orders.

Average sale price for the machine is £27,000, and most customers are either first time users or moving up from VRCs and accounting machines. One IBM System 3/8 has been supplanted in the UK.

Fibres giant signs up SPL

THE Fibres Division of ICI has contracted SPL International to design and implement a minicomputer system for use in the production of polyester polymer at its Wilton works.

The system, based on a Digital Equipment PDP-11/34, will replace an existing computer system and will incorporate enhancements such as improved displays.

To be run from SPL's Manchester office, the contract is the first to be awarded by ICI Fibres to an outside software house for the implementation of a total system. The software will be based on one of ICI Fibres' existing plant control packages.

Prestel promoted in US

THE US promotion of the Post Office Prestel viewdata system is gathering momentum at Telsacs New York offices, said Sam Fedida, the originator of Prestel, is in New York helping to demonstrate the system.

Insac now has two viewdata terminals — one originally and a Sony set which uses the US 525 line standard. Insac has found that the latter displays the system with no problems, and reports that so far service has been continuous and confirmed by the Post Office Engineering Union's action in support of its claim for a 35 hour week.

NEWS IN BRIEF

Industry links with schools

THE Secretary for Education, Shirley Williams, has reaffirmed her belief in the importance of links between schools and industry (CW, March 9) by sending a circular to local education authorities asking them to review the effectiveness of such links in their areas. She emphasises the value of such organisations as the Science and Technology Regional Organisations which promote co-operation. All this is to increase the interest of pupils in "the wealth-producing sectors of the economy".

Atkinson move

THE Department of Industry has confirmed that Reay Atkinson, director of the Central Computer Agency, is to take over from Martin Lamaa head of the Department's Computers, Systems and Electronics Division. Robin Lingord, assistant secretary at SE Division, is expected to move to a different job within the DoI.

Exhibition

EIGHT different personal computers will be on show at Ed Tech '78, an exhibition of educational and communications technology at Holland Park School, London from August 22 to 24. Among the computers will be the Commodore Pet.

World survey

IN a survey of world business covering 750 major companies in 60 countries outside the US, only one manufacturer of data processing equipment is big enough to be listed, ICL. The survey is published by the US Magazine Business Week, and analyses the performance of all the key industrial companies. It shows ICL's sales for 1977 as being worth $731.8 million producing profits of $31.6 million.

Legal system

A COMPUTER system for solicitors has been launched by Altergo Computers which can be run on either the Formula 1 microcomputer or the Avenger minicomputer. Called Precedent, the system handles client accounts, time recording, word processing and the production of legal documents.

DoI spending

EXPENDITURE by the Department of Industry on R&D in Computers, Systems, and Electronics for the year 1977-78 was £8,996,000. This compares to the previous year's £10,371,000 and a projected figure for 1978-79 of £12,407,000. The Department's total expenditure on all areas for 1977-78 was £125 million. Among the computer research programmes that have been supported are those on computer networking, man-computer interaction, development of Coral 66, and microprocessor applications.

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Big things are hatching at Data Logic

MICRO NEWS — Edited by Martin Banks

France to follow the Inmos trail

IN a move that closely parallels the current developments in the British microelectronics industry, the French now seem close to launching their own advanced technology microelectronics company, called Secimos.

The plans for the company, which are still the subject of active negotiations, look remarkably similar to an amalgam of the National Enterprise Board's Inmos venture, and the new joint company being formed by GEC and the US company, Fairchild.

Like Inmos and GEC/Fairchild in the UK, it will be a new company with a French manufacturing base aimed at developing new devices in advanced microelectronics technology to meet the growing number of new market opportunities. Like the GEC-Fairchild collaboration, it would involve the direct participation of existing, US-based companies in the field — in this case, both Intel and Mostek.

Intel's participation in the venture will be direct enough to include a financial stake, thought to be around the 20% mark, as well as giving the venture second source licences on selected products and its N-MOS process technology. Mostek will also be providing second source licences, but French sources indicate that its financial participation would revolve around the new French company buying out the stake in Mostek held by another US company, Sprague. Should this happen, it opens the intriguing possibility of Intel becoming an indirect shareholder in Mostek, one of its main competitors.

The French partners in Secimos (Société Européen Circuits Integres MOS) are, however, harder to pinpoint.

As the formation of the company forms a part of a still to be finalised overall "plan" for the French integrated circuits business, the French government is certain to be a principal shareholder. Private companies such as CGE (the French equivalent to GEC in the UK) is also being tipped for an important stake, and would no doubt take an active role in running the company.

An interesting addition to the potential shareholders roster however, is the State-owned car manufacturer, Renoult, which is expected to come in as a sleeping partner. France's biggest industrial company, Saint-Gobain-Pon-à-Mousson, is also understood to want a leading position in the venture, or at least one like it that would involve Intel.

As with the UK's Inmos venture, the reasons that are bringing Secimos to fruition are based on a straightforward challenge and an analysis of the current industry.

The challenge is to get the French semiconductor industry to succeed in world markets with standard products, while the industrial analysis, carried out by a small team headed by the former president of Texas Instruments in France, Monsieur Boncili, has proved that it is possible to arrive on the market late and still succeed.

This almost exactly parallels the thinking of the NEB and Mackintosh Consultants in the development of Inmos.

The Industrial analysis has identified the telecommunications market as a prime target for new product developments. It is a market that is more active in Europe then in the US, according to the French, and therefore presents the best opportunity for a European manufacturer to gain an important share of a world market, as it develops.

One of the first products for this market will probably be a Codec (coder/decoder) system for digitising speech. This is an area already being investigated by several companies, including Intel.

Initially, however, Secimos will start operations with a range of some 40 devices second sourced from the catalogues of Intel and Mostek, a move which, it is hoped, will put the company directly into the world market-place while at the same time benefit its own technological development. By having both Intel and Mostek second source agreements, Secimos would have alternative product solutions to many applications, hoping to expand its competitive capabilities.

According to French sources, competition will be a dogma with the new company, not only with other French manufacturers such as Sescosem, but also on the world market.

An early requirement for the company, once it is formally launched, will be the hiring of some 20 circuit designers and, as with the UK industry, it is considered imperative that some of the indigenous engineers that have "brain drained" to Silicon Valley be tempted back to the home industry.

Though at 400 people, the estimate of total staff required is well under the projections for both GEC/Fairchild and Inmos, and is probably a more realistic figure considering the plans for "off-shore" assembly of the devices in Tunisia and Morocco.

The turnover target, however, is being set high, and the objective is to hit the F400 million mark by 1985. This is based on an estimated 30% share of the French market, together with a significant share of the total European market.

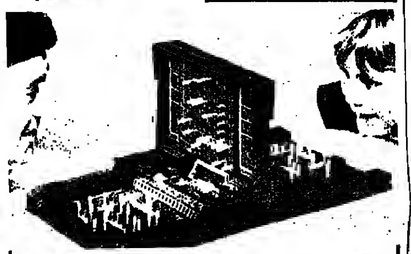
Iskradata 1680 from Yugoslavia

WHAT is thought to be the first microcomputer system to be designed and built by an East European Socialist state has been introduced by the Yugoslavian electrical and electronics company, Iskra.

The system, Iskrodata 1680, based on a Motorola 6800 microprocessor, follows standard architectural thinking in its design, in that a central data bus is used to allow the construction of flexible configurations.

Available for the system are single board modules for the CPU, a range of memory cards that allow expansion up to 64K bytes, and parallel and serial I/O. In addition, there are facilities for EPROM programming and cassette, and the system comes complete with a front panel console that allows direct access to the microprocessor registers.

The system can operate with teletypewriters, upto four video terminals, four floppy disc drives, and a variety of printers. Its software currently includes a Monitor, Basic, Assembler and Disc Operating System, and some applications programs have already been developed. Additions to the software products range are expected later in the year.



NOTHING, it seems, is secret from the advance of microprocessor applications, as the picture above shows.

Those happy school days spent at the back of the class during the Latin period, playing battleships happily and quietly on pieces of paper are soon to be banished forever. From now in it will be computerised. The Computer Battleship from MB Games, and together with another computer game called Logic Five, it is due to be launched in October.

Based on a Texas Instruments TMS 1000, 4-bit microprocessor, with no additional memory, it allows the traditional two players to zap each other's ninth fleet to an accompaniment of full visual and sound effects. At £27, it makes NATO war games seem a bit extravagant.

Nippon claims the fastest microprocessor

TECHNICAL developments in integrated circuit design continue to push the capabilities of the devices into new realms of speed and power, and much of that development effort is now being concentrated in Japan. This has again been illustrated by the introduction of a 16-bit microprocessor by Nippon Electric, which is claimed to be one of the fastest processors produced so far.

Samples of the device, called the MicroCom-16000, are scheduled to be available later this year.

Two particular design innovations have been used to produce the device which give it a register-to-register add time of 0.8 microseconds. The primary design development employed involves the layout of the circuit elements to ensure that the interconnection paths between them do not exceed four microns in length. In addition, an enhancement/depletion type element construction technique is used that involves the partial incorporation of SMOS technology in the device, and leads to a low rate of power consumption that is, typically, one watt.

According to Nippon, the register-to-register add speed is faster than some minicomputer systems that are available, and between three and eight times the speed of existing microprocessors.

Up to 1 Mbit of memory will be directly addressable with the device, and it will include eight different addressing modes to improve the utilisation of program memory.

Micro chess

INTERNATIONAL chess master, David Levy, is to direct the Microchess championship which is one of the attractions being planned for a personal computer exhibition at the West Centre Hotel, London. The championship, to be held on September 21-23, will feature small computer systems playing chess against each other.

Basic wage and labour costs

I AGREE with many of the points made by Geoff Beacon in his article (CW, July 20). We do, however, interpret certain words and phrases differently.

I do not think in terms of a fall in the value of labour so much as a reduction in its incremental cost over the cost of unemployment. Labour which is made redundant by one form of technology can be of value in alternative jobs provided the customer can pay for it. We are in the ridiculous situation of paying many unemployed to do nothing at a level which prevents an employer taking them on to provide goods and services at a price we can afford. A basic national wage on the terms I have described would help overcome this problem.

I do not agree that a BNW must be paid for by taxing the more affluent any more than they are for unemployment costs. I suggested that a BNW should be set at a level equivalent to unemployment payments. The lower salary increment paid by the employer could be much that the employee's receipts, the burden on the company economy and taxation on the rich would be the same. The important difference would be that the increment to a company's salary bill when hiring a person would be smaller.

Beacon and I have an important difference in belief which creates different assumptions. I believe that, subject to the safeguard of subsistence for everyone, the free market should decide what the customer wants to buy. Beacon lays the decision at the door of a group of people who decide where and how subsidies should be paid in the hope that they decide on a service or product that the market wants. I do not say the subsidies can only be a short term measure but that, if used, they should only be a measure to overcome a short term problem since otherwise they are countering a natural market disinterest.

In conclusion, the way of introducing a BNW and adjusting the tax methods needs careful consideration. The taxation must not nullify the incremental accounting that is the advantage of a BNW and negative taxation does not look suitable either.

DERRICK GROVER
Haywards Heath,
Sussex.

LETTERS

The final indignity

IN Downtime, Chad refers to the Post Office being immune to errors in cutting off telephone connections.

We are a sub-post office and pay our telephone bill via our weekly returns to Cambridge head office. Our remittance for July, 1976, was apparently mislaid within Cambridge and we subsequently received a final demand.

Our protestations were referred to the man "with his hand on the switch" only to be told that he had no record of us being a sub-post office. Goodbye and click!

The final indignity was to get the line reconnected via the telephone kiosk which has stood in our front garden since 1937 — rent free!

R. NEWTON
Soffron Walden,
Essex.

Another PROLOG group

I REGRET that Michie's Privateview (CW, August 3) failed to mention all PROLOG groups. He used a sentence that gave the impression that PROLOG is only available in four places.

At least one more group is at work — at the National Civil Engineering Laboratory, NCEL, in Lisbon, Portugal. It would have been nice to have this group noted, as the machines used are different from the commercial ones listed by Professor Michie.

HELDER COELHO
Edinburgh

I DO hope Inmos is not set up in Glenrothes merely because it is a marginal Labour seat.

GRAHAM JONES
Ash,
Kent.

f.m. tuner

Our article in this issue describes an f.m. tuner based on an already highly successful design by L. Nelson Jones. The author has now redesigned the circuit around two new integrated circuits which offer an even better performance. A modified and pre-aligned front end module provides a large signal handling capability and simplifies alignment.

Trends in Microprocessors. See also a general discussion on developments now taking place in 4, 8 and 16-bit devices and in bit-slice systems.

Tunable or Parametric Audio Equalizer. We describe one which functions as notch filter, shelf filter, graphic equalizer or Baxandall-type tone control.

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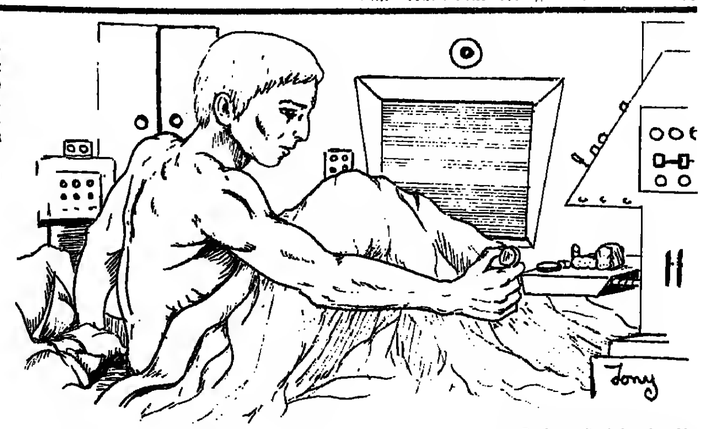
One of the two special prizes in the Computer Weekly/ Datskill essay competition, Computerstyle 2000, went to PAUL HOLDEN of Dublin, whose entry appears below.

Holden, who works for Applied Management Systems, sees life as clinical, uniform and regimented. The hero, Stoddard, dreams at night of a different culture based on small communities. Just as he reaches the climax, the machine wakes him with the next day's timetable . . .



Our hero, after being given his timetable for the day, consumes his regulation breakfast. Experience had taught him that to omit it or for that matter, any of the ingredients in the meal was dangerous. One visit to the infirmary was enough.

'Good morning Stoddard, here is today's timetable ...'

SLOWLY, the euphoria drained away. He couldn't hold on to it. He was being dragged down. His head felt numb, and he was unable to focus on anything. The spark of light went out.

He crawled out of bed, and the luminous cursor appeared on the screen and began its tireless dance, leaving behind it a string of words.

"Good morning, Stoddard. Here is your timetable for the day."

It always began like that. He remembered, with faint amusement, how it had once made him a happy new year three days in a row. Now it was always "good morning." Somehow, he felt, programs with bugs were more interesting.

The list of instructions — euphemistically, his "timetable" — made no more sense to him that day than any other. He had to be in certain places at certain times. He had to carry pieces of paper from one place to another. He had to sign things. He had to copy sections of text, by hand, from one piece of paper on to another. He had to read aloud from a document for half an hour in an anechoic chamber. He saw no sense in it.

Though he saw no sense in it, he knew, or rather, he felt, that it was not worth bothering to ask. There was no one to ask. No-one would respond to impertinent questions like that. Other citizens grew up like him, were educated like him, lived like him. They conformed, because it was impossible to conaidar an alternative. Whanever a stray doubt crossed your mind the feeling of being watched intensified. The screen seemed to grow brighter. You learned not to think those kind of thoughts. It was more comfortable.

His breakfast came out of the slot. It was the usual combination. Two slabs of white cellulose lay on the plate with half a dozen pills. He knew that the bread, a tasteless mass, was only to supply bulk, and that the pills contained all the nutrients considered essential by the Department. Experience had taught him however, that to omit it or, for that matter, any of the ingredients in the meal, was dangerous. One visit to the infirmary was enough. He was lucky to have recovered from the experiments.

He began on his timetable. As always, the screen knew where he was, because he was where the screen had told him to be, at each place. The screen reminded him of his duties, where to go next and what to do there. He did what he was told.

The complex had a canteen in the basement. He had lunch there, along with the hundreds — maybe thousands, he never knew — of others in front of the dispensing machines, who placed their hands on the pad, and were delivered personalised meals through a slot. The ingredients were carefully calculated to supply the correct nutrients for their weight and height. The meal consisted of some tasteless bulk and a handful of pills.

He took the plastic plate to a table where three people, two women and a man, were already seated. He vaguely recognised two of them, but was embarrassed that he could not recall their names. He had never seen the blonde woman before. The three were talking when he sat down, discussing the weather.

"My friend in Weather," the taller woman was saying — Kama, that was her name — "told me that tomorrow would be fine, but that they had to arrange some rain for Wednesday. Something about visiting foreign dignitaries."

"Well, I hope they give us a decent summer this year," the man, his mouth full of the brown fibrous stuff, spoke up, "not like the last few years. One week sunshine, one week rain. Those guys in Weather have no imagination." The group fell silent, and Stoddard could not think of anything to contribute to the conversation.

Somewhere a buzzer sounded, and the three stood up to go, nodding at Stoddard on their way.

He knew that the bread, a tasteless mass, was only bulk and that the pills contained all the nutrients considered essential by the Department.

For the afternoon, his instructions were different. He was to report to the gymnasium for a programme of exercises. "Sport," they called it. This started appearing on his timetable some weeks previously. He had mentioned one day at lunch that he felt tired. Now his programme was such that he finished each afternoon truly exhausted.

The large screen displayed his target — 10 laps at 20 kilometres per hour. It showed that he had completed seven laps at 28.5 kilometres per hour, when he fell. He limped painfully to the console, and reluctantly, requested assistance.

He was helped to the clinic by a white-coated orderly. There was a queue in front of him — twisted ankles, like himself, cuts and bruises, and a couple of middle-aged men who had clearly overdone it, he thought. They were coughing and gasping for breath. The queue moved slowly.

He came out with his ankle bandaged up, grateful that they hadn't sent him to the infirmary. It was dark. The screen told him to report directly to the Entertainment Centre.

When he realised that he had missed dinner, a strange feeling overcame him. He remembered the last time, and he felt sick, with a mixture of fear, excitement and hunger.

Nausea gripped him during the mating session at the Entertainment Centre. It was beyond him that people used to enjoy this. As soon as he could, he went to his room, took the pills and lay down. The screen went blank.

The empty feeling in his belly swept up and over him, filling his head with a sort of lightness. When he closed his eyes, the world became more vivid, more alive. He entered this world gladly.

The first rays of the sun were playing with the drops of condensed moisture on the window when he opened his eyes. Around him in the long room, seven others were waking, struggling into clothes. It was cold. Jobina was already sitting at a terminal, occasionally jotting down some notes on a pad. Ochard was looking over her shoulder. As they came downstairs, they each helped themselves from the large black pot of oat porridge that had been on the stove all night and sat at the long table. They ate in near silence, and then began planning their activities for the day.

Their speciality was carpentry, and their skills were much in demand. Jobina reported that

The group split up, some going to the workshop, some to the fields. Stoddard and Jobina took the truck to a commune . . . where they were needed to replace some floorboards and fix a rail on the stairs.

there were orders in for five kitchen tables from communities within a sixty kilometre radius. They were committed to supply three of these within a month. The other two were the subject of discussion.

"But what have they got?" one of the men was saying, [illegible] a few words on the keyboard.

"They have leather and onions."

"Sounds like last night's dinner," someone interrupted, laughingly.

"And they repair agricultural machinery."

"Hey," Stoddard himself spoke, "find out if anyone knows anything about grain mills. If we can get that old one fixed up, we can save ourselves about three hours' labour a day."

The screen flickered in response to Cannee's fingers.

"Not in South-West-Nine. But hang on a minute, someone in South-West-Three can fix the mill, and they need onions and a pair of shoes. So we can do the deal with South-West-Nine through South-West-Three."

"Okay, but warn them that they'll have to wait a few weeks for their table."

The group split up, some going to the workshop, some to the fields. Stoddard and Jobina took the truck to a commune situated about ten kilometres distant, where they were needed to replace some floorboards and fix a rail on the stairs. This commune had about 80 members — considerably larger than their own — and it operated an electronic workshop, supplying the components for the information retrieval and communications network over a wide area. By common agreement, they got all their necessities and services without charge, and in return they were committed to fast and efficient maintenance, as well as regular improvements to the network.

Stoddard and Jobina worked all morning and were back in time for a lunch of bean soup with thick slices of dark brown bread. The community was noisier than at breakfast, discussing the morning's work, and planning the afternoon. Stoddard booked an hour on the terminal to continue his research into ancient cosmology by using the databanks available on the system. He was correlating archaeological evidence with myths in all the continents and with religious documents in a variety of cultures.

In a single afternoon he was able to do work that would have been impossible in a lifetime if he was dependent on searching through books in libraries. He was able to test hypotheses against models and then change the hypotheses or the models.

He had registered this particular interest of his with the educational index a few months previously and had met two others who were interested in the same line of research. One was an 83 year old man who had been pursuing the same line for over 20 years, and who was able to help Stoddard a lot.

The other was a woman of his own age. The three of them met about once a month, but if anything really significant turned up, they could communicate it to the others within minutes.

Dinner that evening was a feast. Ochard had spent the afternoon at the river and had caught half a dozen fine trout. To celebrate the occasion, they opened a bottle of wine and the evening became a party, with music, song and dance.

When darkness fell, they went to bed. Stoddard lay beside Jobina. "D'y' know," he said, "every time I eat fish, I have nightmares."

She laughed, "Don't be silly, it's just your imagination."

"I hope so," he replied, "I really hope so."

But the effect of the wine was wearing off. Slowly the euphoria drained away. He couldn't hold on to it. He was being dragged down.

His head felt numb, and he was unable to focus on anything. The spark of light went out.

A CONFERENCE aimed at senior management and entitled the Profitable Exploitation of Microprocessor Technology has been organised by European Study Conferences and will take place at the Hilton Hotel, London W1 on September 7. Speakers will include Dr Jan Stuart, Trevor Gilpin and Dr Christopher Evans from the Dpt. Barrie Sherman the research director of ASTMS, and J. Gallacher of Praxis Instruments. Further details from ESC Ltd, Kirby House, 91 High Street East, Uppingham, Rutland, LE15 9PY, tel: Uppingham (057 282) 2711.

THE 1978 Conference of the Stress Analysis Group of the Institute of Physics is to be devoted to stability problems in engineering structures and components. The conference will be held on September 12-14 at University College, Cardiff. Further information may be obtained from Mrs M. W. Ellis, Dept. of Civil and Structural Engineering, University College, Newport Road, Cardiff CF2 1TA. (tel: 0222 44311, ext 7072.

A THREE-DAY seminar entitled Team Management and organised by Computer Weekly Associates with Language Information Systems will be held in Amsterdam on September 4-6. It is aimed principally at DP managers, project and user management. Further details can be obtained from Michael Naughton at Langton on 01-836 4605.

A CONFERENCE to review and assess Post Office telecommunications has been organised by ISI: Information Studies Limited. It will be held on September 20-22 at the Cumberland Hotel, London W1. For further information contact Roger Baines at 21 Duns on Chorleywood 4044.

A PROGRAMME of word processing workshops is scheduled to take place at the Stockport College of Technology on September 12-14. It has been organised by the Management Studies Centre of ICFC. A three-day supervisors' course will run concurrently with the workshops, and there will also be a display of equipment. For further details apply to Management Studies Centre, 61A George Street, Richmond, Surrey TW9 1HL, tel: 01-940 5656.

THE International Council for Computer Communications (ICCC) biennial conference is to be held in Kyoto, Japan this year. The theme will be Evolutions in Computer Communications, and the dates are September 26-28. The conference will be held at Kyoto International Conference Hall. For further details contact the ICCC-78 Executive Committee c/o International Affairs Bureau NTT, 1-6 Uchisaiwai-cho 1-chome, Chiyoda-ku, Tokyo 100, Japan.

MULTI-MICROPROCESSOR Systems is the title of a conference organised jointly by the Polytechnic of Central London and the French Institut de Recherche d'Informatique, IRIA. It will take place at the Polytechnic on October 2-6. For application forms write to IRIA, SEPT-Formelles, B.P. 105, 78150 Le Chesnay, France, tel: 954 90 20, ext 875.

VIEWDATA — the previous carriage was a seminar presented by Mills and Allen Communications on June 21. It is to be repeated on September 27, with the addition of 4 sessions by Ken Knight entitled Introduction to Prestel. Further details from Mills and Allen at Broadwick House, 15-17 Broadwick Street, London W1V 2AH, tel: 01-439 8941.

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For further information on any of the above vacancies please contact the appropriate consultant.
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Ref: 150/CW/Fran Setter

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Ref: 151/CW/Fran Setter

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Ref: 740/CW/Marian Tabone

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If it would be more convenient to telephone in the evening, or weekend, the telephone numbers are:
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Motorola's lead in the semiconductor industry has been established through continuously progressive policies and high standards of selection.

At present we are looking for a well-qualified computer professional for the key post of a Programmer/Analyst at our East Kilbride manufacturing complex.

Our modern and well-equipped computer unit operates in liaison with similar groups in Geneva and Toulouse, and we have three RJE terminals to Motorola computer centres in Phoenix and Chicago.

The man or woman appointed will have around five years experience in programming and systems analysis and complete familiarity with IBM O/S. Experience of COBOL is essential and a knowledge of TSO would be useful. This should be backed up by experience in a manufacturing environment and a willingness to travel in Europe.

A substantial executive compensation package is offered, consisting of a generous salary and an excellent range of management benefits.

Please write with full details of your career to date to Alan Smith, Personnel Officer, Motorola Limited, Colvilles Road, East Kilbride.

MOTOROLA

LK Tool Company Limited

Leaders in Measuring Machine Technology require

COMPETENT MINI COMPUTER PROGRAMMERS

to join an expanding team working on varied high technology projects including N.A.S.A. Space Shuttle Programme.

Applicants should be experienced in Fortran, with good mathematical background and preferably engineering experience.

Please contact

Roger Gilheany
LK TOOL COMPANY LIMITED
East Midlands Airport
Castle Donington, Derby
Telephone: Derby 811349

KENT COUNTY COUNCIL

HIGHWAYS AND TRANSPORTATION DEPARTMENT

Kent County Council Sub Unit
South Eastern Road Construction Unit

Design Staff Section Engineer

£6,060-£6,702 (inclusive)

Extensive Road and/or Bridge design experience covering approximately five years since chartership is essential. The successful applicant will be in charge of the Computer Applications section of the Sub Unit. Particular knowledge of the latest computer techniques related to Motorways including both roadworks and structural design is also essential.

Application form, returnable by 31 August, from the Chief Engineer, SERCU, Concorde House, 10/12 London Road, Maidstone ME16 8QA. Phone (0622) 673881 Ext. 32.

IRISH RECRUITMENT FEATURE

Advertisers are reminded that the next Computer Weekly area feature will be published on August 24 and will highlight career opportunities in Ireland.

Space reservations should be made as soon as possible to:

Owen Kelly — Manchester — 061-872 4211

Eddie Ferrell — London — 01-261 8097

Copy Deadline PM Friday before

COMPUTER WEEKLY
THE INDUSTRY'S WIDEST READ AND MOST REQUESTED NEWSPAPER

Abraxas Recruitment Division

ABRAXAS West End House, 11 Hills Place, London W1R 1AG — 01-439 8891

OPERATIONS
ICL, IBM, PDP, MINIS, UNIVAC, NCR

IBM DOS/VS — £4,500
C LONDON/MIDDX. Two international companies require experienced DOS OPERATORS. Both run TWO SHIFT systems. Days and Evenings and employees enjoy a great many benefits. These include Free/Sub Restaurants, Annual Bonus, Non-Cont Pension, Season Ticket Loan and 4 Wks. Holiday.

ICL 1900 — To £4,500
SENIOR OP. required for company based in MIDDX. Experience of either GEORGE II or 11+. Three shift system covering 5 days a week in operation. Good conditions of employment and highly rewarding work.

NCR — c£4,000
C. LONDON. Operator req'd. for NCR CENTURY installation based in C. London. Interesting position offered good prospects and the opportunity to retrain on IBM 370 mainframe.

UNIVAC — c£4,500
Experienced operators on UNIVAC 1100 Series req'd. for busy installation in London. EXEC 8 knowledge required. Five day week, good promotional prospects and very good large company benefits.

IBM OS/VS1 — £4,500+
OS/VS1 experience is currently much sought after by many companies situated in and around LONDON. Salaries are highly competitive together with many varying company benefits. Mortgage subsidies, Travel concessions, Life Assurance, Restaurants/L.V.s and BUPA. Contact Abraxas for further details.

IBM DATA CONTROL — c£5,250
C LONDON. Position for positive articulate creative applicant with at least three years' experience in DATA CONTROL which should include documentation on new systems and USER LIAISON. Excellent company benefits.

PDP 11 SERIES — c£4,400
BUCKS. Operators/SNRS. req'd. for new installation offering training for operators with or without PDP experience. Good prospects into programming.

N.C.R. — c£4,250
C. LONDON OPERATORS/SNRS. Required for various positions in and around London. MINIMUM of 5 months' experience required.

JUNIOR OPERATORS — £3,000-£4,000
CITY/C. LONDON. Several vacancies exist for keen Juniors with 5 months + experience. Salaries vary according to age and qualifications. ICL 1900/2900 or IBM 360/370 required. Excellent training offered and early promotion will follow. Applicants must be aged 18+ and prepared to work shifts.

DATA CONTROLLER — £3-£5,000
Experienced Data Control Clerks are required for various installations/hardware at both Junior and Senior levels. Salaries vary with age and experience but range between £3,000 to £5,000. Ring Abraxas now for details of vacancies in your area.

PDPII/ANY MAINFRAME — c£3,800
C. LONDON. BANKING organisation require operators with any computer experience to train on PDPII machines. TWO SHIFTS over a five day week. Excellent company benefits.

TRAINEE JNRS. — To £3,000
Many vacancies exist in and around the London area for JUNIOR OPERATORS with at least 4 O-levels. Must be prepared to work shifts. For more details on jobs in your area, ring ABRAXAS NOW.

FOR VACANCIES IN YOUR AREA PLEASE RING ABRAXAS NOW

Abraxas Computer Employment Ltd.

£7.5K SOFTWARE SYSTEMS Herts
Group leader required with project management experience and preferably a programming background. Applications are within a turn computer manufacturing environment.

To £8K SYSTEMS ANALYST Herts
A background of commercial experience is essential and capability of supervising others, in the project management role, is desirable. IBM 53 in distribution environment.

£4K-£5K JNR. O & M ANALYST Herts
An O & M qualification and minimum one years experience is required for the position the programming involved is in-house with a systems manufacturer.

188 Finchley Road, London, NW3 6HP

AUSTRALIA

SYSTEMS ANALYST

We are the service company for the Australian banks' national credit card scheme — Bankcard.

Our Systems Manager is visiting Britain during the second half of September. He would be interested to meet Systems Analysts who are considering emigrating to Australia. (Our offices are in the Sydney area.)

If you have spent more than 5 years in EDP with some proven Systems Analysis experience with batch applications, please email a résumé to reach me by the end of August.

We operate twin IBM/370 equipment in both batch and real-time modes. Network applications are front-ended through PDP minis.

We shall negotiate attractive salaries and benefits for the right applicants.

Please send résumée to

Allen Smith, Senior Systems Analyst
CHARGE CARD SERVICES LIMITED
P.O. Box 73
Auburn, N.S.W. 2144, Australia

EXCELLENT OPPORTUNITIES FOR CONTRACT STAFF

In line with current expansion plans we will be pleased to hear from programmers, analysts and consultants of professional disposition with a solid background on any of the following disciplines

MARK IV FORTRAN
COBOL, BASIC
PL/1 RPG
BAL

and any DATABASE or TP MONITORS

Forthcoming internal projects include developments on in-house equipment. Current external projects are both U.K. wide and overseas-based.

Please telephone or send career details to:

MARGARET ORISCOLL
TANGENT COMPUTER SERVICES
BROOK HOUSE, 4 EASTERN ROAD
ROMFORD, ESSEX RM1 3PJ

TEL: ROMFORD 0708-44181/2

Top contract fees

Project Leader

Systems Development
Lancashire, to £7,000

G.M.S. Computing Limited, an expanding autonomous subsidiary of the Johnson Firth Brown Group, provides bureau services to both in-house and external clients. Consistent demand for the company's wide range of services has created the need for a new project team based west of the pennines. The successful candidate will lead a small multi-purpose team concerned with all aspects of application systems from design through to implementation. Applicants, aged at least 25 and ideally graduates, must have in-depth project experience in a manufacturing environment. The ability to work without supervision is essential. The current management is young and enthusiastic and there are excellent career prospects. Consideration will also be given to appointing other candidates with potential to less senior positions.

J.C. Parkin, Ref: 45202/CW
Male or female candidates should telephone in confidence for a Personal History Form to:
SHEFFIELD: 0742 - 731241, *Bank House, 100 Queen Street, S1 1UF.*

Hoggett Bowers
Executive Selection Consultants
BIRMINGHAM, CARDIFF, GLASGOW, LEEDS, LONDON, MANCHESTER, NEWCASTLE and SHEFFIELD.

South West Thames Regional Health Authority

DATA CONTROL SHIFT SUPERVISOR

Tooting, London SW17 **£4496-£5659***

The introduction of 2-shift working has created the need for an additional supervisor to be based at the Regional Computer Centre located in the grounds of the Springfield Hospital, Tooting, London SW17.

The person appointed will take charge of a small data control group responsible for controlling the workflow between the Regional Computer Centre and its users.

Computing, within the centre, is based on powerful ICL 1903T hardware, running under George 3, which supports a variety of management information, financial and medical applications.

Close liaison with other Operations Department Section Heads is also an essential part of the job. Previous experience in a data control environment although desirable is not essential as full in-house training will be given.

For further details, phone me, Les King, up to 8.00 p.m. each evening, or write to: Modem Computer Services Limited, FREEPOST, London WC2N 5BR. 01-839 3351.

*Including Shift Allowance and London Weighting

Freelance Contracts **MODEM** Permanent Positions
Consultants in Data Processing

PERMANENT

ESSEX

SYSTEMS ANALYSTS to £6k

If you have one or more years in Systems and like working for a Manufacturing Company involved with developing new systems, then our Client would be very keen to see you to discuss existing career prospects. Expertise of IBM Mainframe Computers would be a distinct advantage. 1CA17

SYSTEMS ANALYSTS to £6.3k

Our Client is seeking at least three good systems people to help them develop their Real-Time MIS projects. Based on a number of Univac 80/30 machines the current system is supporting over 145VDU's. If you are interested in gaining excellent on-line experience in a dynamic environment with first class prospects, please do not hesitate to phone us immediately. 2CA17.

ANALYST PROGRAMMERS to £5.5k

If your background relates to IBM 370, Cobol preferably with some Assembler and you like working in a progressive atmosphere developing new systems then our Client would be very interested in talking to you about your future. Numerous large company benefits are offered. Please phone now for immediate assessment of your chances. 3CA17

PROJECT LEADERS/SYSTEMS ANALYSTS to £7k

Our Client, a large manufacturing and wholesale company is seeking competent Analysts and Project Leaders to help them enhance and develop their business. Centred around an IBM mainframe configuration, these opportunities provide you with an excellent chance of furthering your career locally. Phone now for details. 4CA17.

CHIEF PROGRAMMER/SYSTEMS DESIGNER to £7k

If you have good PL1 experience and have the ability to motivate and inspire people to produce good Systems under your guidance or if you have expertise in design of advanced systems then our Client would be very interested in talking to you about your future prospects with them. Phone us immediately for more details/information. 8CA17.

ANALYSTS/ANALYST PROGRAMMERS/PROGRAMMERS to £6.5k

Our client is located in a rural setting where housing and living costs are very modest. The configuration consists of a large IBM 370 grouping operating in Real Time mode and supporting over 100 VDU's. If you have sound financial systems experience and/or Cobol/Assembler and you fancy cutting costs all round, including travel, then please do not hesitate to telephone us now. 6CA17.

SURREY

PROGRAMMERS to £5.3k

Only two years experience of IBM 370 Computers using BAL or PL1 could land you in a lucrative position with this very progressive company involved in the financial and insurance markets. A 4% mortgage is also offered, together with the normal large company benefits. 7CA17.

PROGRAMMERS to £4.8k

If you have only 18 months Cobol experience preferably with IBM 370 Computers then here is an ideal opportunity to move quickly for a high salary and excellent prospects. Our client is a large dynamic Chemical concern. Don't hesitate to get in touch for more information. 8CA17.

CENTRAL LONDON

SENIOR OPERATIONS RESEARCH ANALYST to £8k

If you can supervise and possess experience in Linear Programming and have sound operational research ability, then our Client would like to talk to you immediately to gauge your suitability for this very interesting post. An IBM background would be to your advantage. 9CA17.

If you can't see anything here that suits you, still get in touch with us — We have many additional well paid vacancies in Essex and the City.

Telephone John McLean for an up-to-date list of current opportunities on

BRENTWOOD (0277) 212021

or write to him at

LINSCOTT COMPUTER SYSTEMS LIMITED, P.O. BOX 74, BRENTWOOD, ESSEX CM15 0BZ.
Licence No. SE(A) 3007

LINSCOTT
Computer Systems Limited

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

LOOK ANALYSTS!

MIDDLESEX To £6500

With a major upgrade in hardware scheduled for the near future, and a corporate development plan agreed, our client's commitment to O.P. is well established. As a result of this they are able to offer an attractive future to analysts wishing to pursue an active career path, and gain experience utilising Database and Distributed Processing techniques.

If successful, you will probably have been involved with the development of at least one complete system. Beyond that, no specific experience is asked for, only confidence in your own ability and a desire to reach the zenith of your chosen career path.

The company offers an attractive benefit package in addition to the basic salary, and provides a modern and pleasant office environment. These positions are true opportunities for career advancement and can lead to an exciting and demanding future.

Ref. W1/1708

COBOL PROGRAMMERS

CITY OR HOME COUNTIES c £5000

We wish to appoint a COBOL Programmer for our client, a large, well established organisation with diverse interests.

The company has offices in the City and in the Western Home Counties and successful candidates can be based at either location.

Applicants should be able to offer from one year's COBOL programming experience gained on Honeywell, Univac, Burroughs or IBM hardware. There are opportunities to gain more user contact, eventually progressing to systems analysis. Alternatively programmers can progress into the more technical software development area to broaden their knowledge of the industry.

The position carries an attractive salary which is further supported by financial benefits making a comprehensive and generous package.

Ref. E1/1708

3rd GENERATION IN SURREY

PROGRAMMERS £4500 → £6500 ANALYST/PROGRAMMERS

If you can offer one or more of the following, our client can offer you the opportunity to consolidate your career with a 3rd generation environment.

- ★ IBM 370
- ★ COBOL or ASSEMBLER
- ★ SYSTEMS DESIGN/IMPLEMENTATION
- ★ PROGRAM SPECIFICATION
- ★ FEASIBILITY STUDY

Because of the competitiveness of their business, it is considered essential to utilise modern computing techniques wherever possible, so the demand for data processing systems within the group continues to rise significantly. Two additional Analyst/Programmers and four Programmers are now required to strengthen the department and the salaries range from £4500 to £6500 depending on experience.

Conditions of employment are above average and the location is a quiet and attractive district of Surrey.

Ref. S1/1708

PROGRAM YOUR OWN CAREER

N.W. LONDON c £5000

Our client, one of the largest companies in their select field of operations, are keen to keep pace with the latest advances in computing hardware and technology.

They have recently installed a large mainframe in their London offices to support on-line systems from their regional centres.

They are now seeking to develop applications to streamline their services and require COBOL programmers with a minimum of one year's commercial experience who can generate the professional enthusiasm to assist with the introduction of the new systems.

The successful applicants will be working in an environment where DEVELOPMENT as opposed to maintenance, with DATABASE, and on-line programming techniques are available. The company also offer competitive salaries, four weeks' holiday, pension schemes, flex-time and a staff purchase scheme.

Ref. N1/1708

24-hour answering service
Please telephone for a confidential discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 0981

CITY OF DERBY
Delightful area close to Peak National Park

PROGRAMMER

Salary £3732-£5073
(inclusive of supplements)

The successful candidate will join a team developing a variety of applications, including on-line systems.

In September, the Authority will take delivery of an ICL 2950 which will replace the present 1902S. The new machine will initially be run using OME/3 and use of VME/K is planned.

Applicants (male or female) should be suitably qualified, preferably to degree level or equivalent, and must have a knowledge of COBOL. Starting salary will depend on qualifications, experience and age.

Application forms and further details may be obtained from The City Treasurer, The Council House, Corporation Street, Derby DE1 2FF (Derby 31111 ext 818 or 828). Closing date — August 31st, 1978.

ANALYST/ PROGRAMMER

RETAILING

An experienced PLAN/COBOL Programmer with some knowledge of systems analysis is required for our city centre ICL 2903 computer installation utilising magnetic tape, EDS 80s and Key Edit data entry.

Salary will relate to experience and qualifications.

Conditions of employment are attractive and include contributory pension fund (additional to State Scheme), four weeks' holiday after first year, staff discount scheme and sports and social club facilities.

Applications in writing to:

Co-op

Manpower Planning Manager
Birmingham Co-operative Society Ltd.
Personnel Services Division
7th Floor, King Edward House
135A New Street
Birmingham 2 4QL

UNIVERSITY OF LIVERPOOL COMPUTER LABORATORY

Applications are invited for posts in the following areas:

MICROPROCESSOR HARDWARE
MICROPROCESSOR SOFTWARE
GRAPHICS
CAMPUS NETWORKS
GANNET GEORGE 4
DATA CAPTURE AND ANALYSIS OPERATIONS CO-ORDINATION

Appointments will be made on the following scales (under review):

Programmer/Analyst	£3660-£5282
Senior Programmer/Analyst	£5282-£6178
Principal Programmer/Analyst	£6178-£7308

and initial grade and salary will be determined according to qualifications and relevant experience.

A degree in Computer Science or numerate discipline is normally required. The Data Capture and Analysis post is suitable for a candidate with a background in economics or the social sciences. It is unlikely that appointments to the two posts concerned with Microprocessors will be made at less than Senior Programmer/Analyst level.

Application forms and further particulars may be obtained from The Registrar, The University, P.O. Box 147, Liverpool L69 3BX.

The closing date for the receipt of applications is 16 September, 1978 and it is expected to hold interviews towards the end of September. Quote Ref. RV/BB1/CW.

SFENA (UK LTD.)

SOFTWARE/PROGRAMMER

SFENA (UK LTD) REQUIRE A SOFTWARE PROGRAMMER FOR A 16-BIT MACHINE, WORKING ON EXCITING REAL-TIME PROJECTS. Salary £7,000 plus usual perks. Working in a happy atmosphere with a small, friendly staff.

Write to: Mr. A. E. P. Turner
SFENA (UK LTD.)
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ASCOT, BERKS
or Telephone: Ascot 219 88/8

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ANALYSTS ANALYST/PROGRAMMERS PROGRAMMERS

We are replacing our IBM 370/125 with a 370/148 in September this year to enable us to expand our existing systems and develop the following:—

- ●PARTS DATABASE
- ●ON-LINE (AUDIO-RESPONSE) ORDER ENTRY
- ●DEALER ACCOUNTING SYSTEMS
- ●DISTRIBUTED PROCESSING
- ●SATELLITE LINK TO JAPAN

Our principal tools for this development will be:—

- ●DOS/VS UNDER VM
- ●CICS
- ●DL/1
- ●COBOL WITH ON-LINE PROGRAM DEVELOPMENT

If you are an experienced DP professional attracted to this challenging environment we can offer:—

- ●Salaries according to experience
- ●Benefits include — Non-contributory Pension Scheme, Subsidised Restaurant, Preferential Discount on Staff Purchases

Our working conditions are excellent, with good Company relations.

Apply directly in writing, or by telephone for application form to:—

Personnel Department
DATSUN U.K. LIMITED
New Road, Durrington
Worthing, Sussex
Tel: Worthing 68561

Datasolve Datasolve Datasolve

We've made things easy for you!

If you're chasing a new job or a new contract, save time by filling in your application form here and now.

Personal Please write in ballpoint, using block capitals.

Surname ______ Forenames ______
Address ______

Tel. Home ______ Office (discretion will be used) ______
Age ______ Place of Birth ______ Car? ______
Are you prepared to relocate? ______ UK/Abroad (delete)

Experience Place no. of yrs. in box, e.g. IBM 360/370 ...... [4]

Machines: Please specify model.		Applications	
IBM 360/370		Commercial	
IBM others (specify)		Financial	
ICL 1900/2900		Payroll	
ICL others (specify)		Production control	
Honeywell		Stock control	
Univac		Scientific	
Burroughs		Realtime	
PDP		Software	
Other mainframes (specify)		Database	
		Message switching	
		Communications	
Other mini-computers (specify)		Data transmission	
		Central process	

Languages			
Cobol		Teleprocessing	
Plan		MIS*/CPA*/PERT*	
Assembler		Magnetic tape	
PL/1		Disk	
Fortran		Others (specify)	
Filetab			
RPG11			
Auto*/easy*/user code*			
Others (specify)			

Operating Systems		Job Titles	
DOS		Project leader	
OS		Systems analyst	
George (specify)		Systems engineer	
CICS*/HASP*/GRASP*		Analyst/programmer	
DBOMP*/MVT*/IMS*/CMS*		Systems programmer	
Others (specify)		Programmer	
		Operations supervisor	
		Operator	
		Consultant	
		Sales representative	
		Others (specify)	

*Delete where inapplicable

Position sought Please state briefly the type of appointment you are seeking.

Minimum salary £ ______ Notice required/Date available ______
Signed ______ Date ______

Cut out the whole advertisement and post to the address below.

Knight

Knight Computer Services Limited

Staff Services Division of BOC Datasolve Group and a member of Computing Services Association

Knight Computer Services Limited, 14 Old Park Lane, London W1Y 4NL.

01-491 4706

24-hour answer phone

LONDON BOROUGH OF BROMLEY

COMPUTER OPERATOR

(REF. 8.309)

CL.1 Salary up to £3,994 (Bar at £3,190) Plus Shift Allowance

A vacancy exists for a Computer Operator in our 1903T installation running on line VDU and MOP terminals and batch processing under the George 3 operating system.

Applicants need not necessarily be experienced as training would be considered for otherwise suitable applicants.

Five G C E 'O' level passes including Maths and English are necessary and success in an aptitude test for trainees.

Progression beyond £3,190 is dependent upon undertaking supervisory and/or more responsible duties and subject to the efficiency of the officer. Shift working involved, for which payment at a 14% shift allowance is made of basic salary plus £105. Starting salary according to age and experience.

Closing date 1st September, 1978.

Application forms from Assistant Chief Executive (Manpower), Town Hall, Bromley BR1 1SB. Tel. 01-464 3333. Extension 3318.

UNIVERSITY OF NOTTINGHAM

CRIPPS COMPUTING CENTRE

NUMERICAL METHODS SPECIALIST

A specialist in numerical methods is required to join an existing team whose responsibilities include liaison with research workers in the University, and the provision of an advanced numerical and statistical facilities on the Centre's linked ICL 1904S and 1906A system. The team also liaises closely with similar teams in other universities and contributes to the NAG library. Experience of scientific programming languages, preferably Algol or Fortran, is required. Salary up to £4,601 per annum. Application forms and further details from Staff Appointments Office, University of Nottingham, University Park, Nottingham NG7 2RD, returnable not later than 31st August, 1978. Ref. No. 821.

COMPUTER OPERATORS

2-SHIFT

£4,500 LONDON

Conoco, one of the major international oil and energy groups, is actively involved in North Sea Exploration, as well as having refinery and marketing operations in Europe.

Due to expansion of operations, and internal promotion, our London Data Centre, situated in the West End, now needs to recruit two Operators, male or female, to join our existing team of 6 working on a two shift cycle Monday to Friday.

Our current configuration consists of an IBM 370/135 running under DOS/VS; GRASP/VS with 3340 disks and 3420 tapes. Future plans are to upgrade to a 3031 under MVS and introduce on-line processing using the CICS monitor.

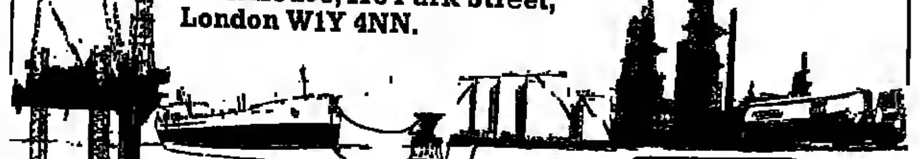
Ideally you should have a minimum of 12-18 months experience on an IBM 370 system and have a sound knowledge of DOS/VS concepts, JCL and utilities.

Career progression for the right candidates are excellent both in the Computer Operations, and into the development area; the company operates a comprehensive training scheme.

Company benefits include free staff restaurant; non-contributory pension scheme; season ticket loan scheme and active sports and social club.

We will be interviewing over the next two weeks, so if you're interested ring Bob Bruce now on 01-493 1235, or write to him at the address below.

Continental Oil Company Limited, Park House, 116 Park Street, London W1Y 4NN.



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P.W.S. is a well-established Lloyd's broking company, based in London, handling a large portfolio of International Reinsurance business.

SYSTEMS ANALYST SENIOR PROGRAMMER PROGRAMMER

CHELTENHAM GLOUCESTERSHIRE

If you want a position with both challenge and interest, then P.W.S. have some exciting opportunities to offer.

Using a new 384K Honeywell 64/20, you will be involved in the complete re-design of our complex systems around the latest Database software.

We should like to hear from people with a minimum of 2 years' COBOL experience, who could cope with tough targets and justify the attractive salaries, generous fringe benefits and relocation expenses offered.

Please write with brief details to John Ross at the following address.

PWS

PEARSON WEBB SPRINGBETT LTD.
The Quadrangle
Imperial Square
CHELTENHAM
Glos. GL50 1TD

UNIVERSITY OF NOTTINGHAM

Mathematics Department

Applications are invited for the post of

COMPUTER ASSISTANT

in the above department

Applicants should have an interest in computing, and should either possess a pass in GCE mathematics at Advanced Level or in a City and Guilds computing course or have experience of working with computers. Duties will include a variety of administrative, operating and clerical tasks concerned with the department's use of its own computers and of the University's computing centre. Salary will be in the range £2580-£3182. For further details apply to the Staff Appointments Office, University of Nottingham, University Park, Nottingham NG7 2RD, returnable not later than 31st August, 1978, Ref. No. 822.

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If you are a young engineer with a good overall technical education, if you like to write, and are also able to communicate in German and/or French, an interesting job and an attractive salary are awaiting you.

Your background should enable you to write for and to share editorial responsibility for one or several publications. If you can imagine yourself in this position, please write enclosing CV to

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Pan European Publishing Company
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Excellent salary
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(Agy)

UNIVERSITY OF BRISTOL
Department of Anatomy

COMPUTER OFFICER

Applications are invited for the post of Computer Officer in the Department of Anatomy.

The work would involve supervising the day-to-day running of a PDP-11 computer system and writing programs, chiefly for the real time analysis of data obtained from experiments on the nervous system.

Salary would be on Scale B (£3,018-£3,984 p.a. according to experience and qualifications) for full-time employment.

Applications for part-time employment on Scale A (salary not to exceed total of £3,984) from programmers with considerable experience will also be favourably considered.

(The salary scales are under review.)

Applicants should write to Dr. M. W. Brown, Department of Anatomy, University of Bristol, Bristol BS8 1TD, describing their experience and mentioning their age and the names of two referees, before September 8, 1978. Further information may be obtained from Dr. Brown, Tel. 0272 24161 Ext. 371.

CHELSEA COLLEGE
University of London

A STATISTICAL ASSISTANT

is required in the Computer Centre to assist in the provision of statistical advice to members of the College and in the maintenance of statistical packages, e.g. SPSS, GLIM, CLUSTAN.

Applicants should preferably have a degree or equivalent qualification in statistics. A good knowledge of Fortran and experience with statistical packages would be an advantage.

The appointment is at Grade 1B with a salary in the range £3,639-£5,732 per annum (inc. £450 London Allowance).

Further details and application forms can be obtained from the Personnel Officer, Chelsea College Annexe, Chelsea Manor Street, London SW3 3TW, Tel. 01-352 1472.

Programmer

Based at Broadway, London SW1

£5108-£5435

Involving much more than just coding, this position will appeal to a programmer who enjoys working on his or her own initiative.

As a member of a small team, the successful applicant will convert existing systems to an in-house mainframe, develop new systems, and provide advice and assistance to users of the Authority's MOP service.

Current computer facilities include interactive terminals connecting to time sharing bureaux and the Authority's ICL 1900 system (1904S with 192k of core and 1,000 Mch of disk storage) and a CMC 5200 used as an RJE terminal to the Authority's IBM 370 system (twin 370/148 with 36,000 mbytes of on-line storage).

Applicants should have several years' experience, including George 3 and Cobol or QPAC and MKIV, and a desire to extend this experience. The post is based in Westminster and offers attractive Conditions of Service, including generous annual leave entitlement.

For an application form, please write to the Personnel Branch, 50-64 Broadway, London SW1H 0DB (Tel 01-930 0754)

Closing date 31st August, 1978

Thames Water

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Our Client is developing several on-line real-time applications on an IBM 370/158 computer using IMS and DC/DB software. Several new systems are scheduled for development in both Financial and production applications areas. The Company, an engineering organisation employing over 1,500 staff, offer excellent conditions of employment. These include five weeks holiday and an active sports and social club.

This is an excellent opening for a Senior Programmer or Analyst/Programmer to take responsibility for systems from investigation through to successful implementation using advanced software techniques. Applicants will have a sound educational background together with a minimum of two years programming in COBOL. Some analysis involvement is desirable although a keenness to extend both technical and analysis skills is of prime importance.

MYRIAD APPOINTMENTS LIMITED Computer Personnel Consultants
Telephone or write to:- 30 Fleet Street London EC4Y 1AA **01-353 0981 (24 hrs)**

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£250 p.w.

We have an urgent requirement for operations staff to assist with an IBM 370 DOS to OS Systems conversion.

Applicants must have a thorough knowledge of OS VSI, JCL, and utilities. Conversion experience will be preferred. Successful applicants will help to train the client's staff.

Salary will be in the range of £200-£250 p.w. Long contracts will be offered.

Please telephone Denise Rees at:
Key Operations Assistance Ltd.

4 Half Moon Street, London W.1. 01-493 5737

COMPUTER WEEKLY

ISSUE AUGUST 31st 1978

Advertisers are reminded that due to Bank Holiday Monday, on August 28th 1978, the copy closing date for the above issue will be **5.00 p.m. Friday August 25th, 1978.**

THE RUGBY PORTLAND CEMENT COMPANY LIMITED

invites applications for the position of

R.P.G. PROGRAMMER

The successful applicant will assist in the further development of the Company's expanding Univac 9480 installation situated at Head Office.

Applicants must have at least one year's R.P.G. experience and must be able to work with only limited supervision.

Promotion prospects are good.

Salary:	Negotiable
Location:	Head Office, Rugby
Other Benefits:	Four weeks' holiday a year; profit participation; non-contributory pension scheme.

Applications giving full particulars should be addressed to:

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The Rugby Portland Cement Company Limited
Crown House
Rugby, Warwickshire CV21 2DT

I.L.E.A.

SOUTH THAMES COLLEGE
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Head of Department
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South Thames College
Wandsworth High Street
London S.W.18 1PP.
or Telephone: 01-870 2241 Ext. 238/9

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c £4250 p.a.

Mobil Data Services Limited provides computing services to Mobil Affiliates in the UK, Scandinavia and Benelux, and seeks Computer Operators who have a minimum of 18 months' experience on IBM 360/370 equipment.

Successful candidates will be required to operate an IBM 370/158 under OS/VS1 with RJE links to UK and Benelux users. This equipment is to be upgraded to an IBM 3031 in early 1979 along with plans to increase the number of RJE and Realtime facilities. Opportunities for advancement are excellent.

Salary, inclusive of shift allowance (five day, three shift) and 40-hour allowance will be c £4250 p.a., dependent on age and experience. Other benefits include Pension and Life Assurance Schemes, four weeks' annual holiday, subsidised cafeteria and Sports and Social Club.

Please write or telephone for an application form to: Frank Ward, Employee Relations, Mobil Data Services Ltd., Becket House, Vestry Road, Sevenoaks, Kent TN14 5EJ. Tel: Sevenoaks 55288 Ext. 137.

Mobil

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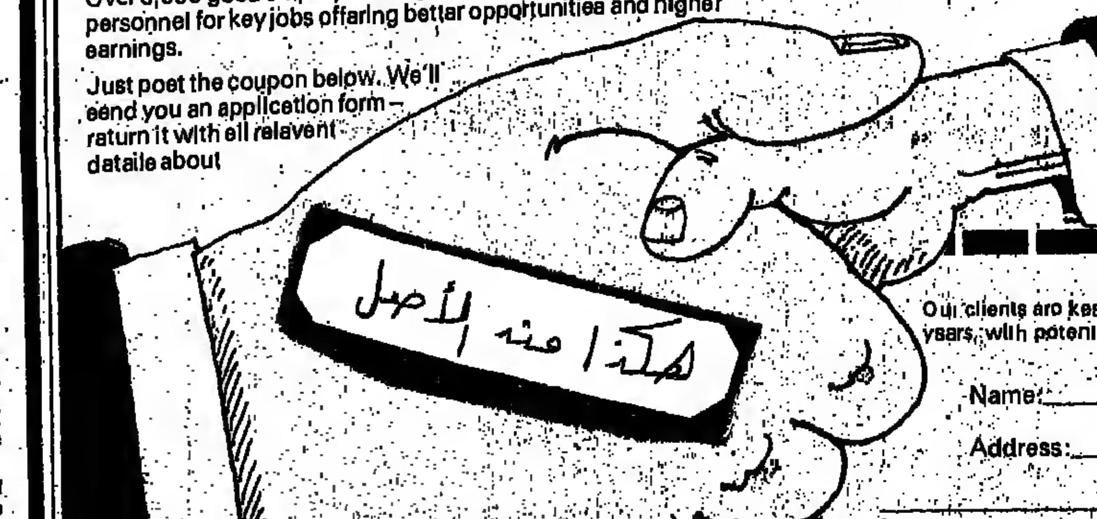

Our clients are keen to meet men and women, aged 20 to 40 years, with potential earnings of between £4000 and £7500 p.a.

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CONTRACTS

CORAL 66 — SOUTH COAST

We have immediate requirements for Analyst/Programmers with solid experience in Coral 66 and Real Time systems. Candidates able to offer knowledge of PDP 11s using RSX11M operating system will be given preference but this is by no means essential. Contracts are expected to run between 6 and 9 months.

BASIC + RSTS/E — LONDON & HOME COUNTIES

We are currently searching for Programmers, Analysts and Consultants to make up numerous teams to work on different development and conversion projects for various clients, incorporating a vast range of commercial applications. It is anticipated that contracts will be from 3 to 12 months in duration.

PDP 11 — CITY

Your client is currently seeking two first-class Analyst/Programmers to take two banking and investment systems from design to implementation. Candidates are likely to have at least three years' experience, of which at least 12 months will have been spent with DEC hardware. There are long-term contracts with an anticipated running length of 18-24 months.

The same client has a Third contract available for a DEC orientated Systems Programmer with a sound knowledge of RSX11 to look at middleware implementation of a banking system. Experience of Real Time systems would be desirable. Length, 6 months.

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IMI SUMMERFIELD

Computer Programmer

IMI Summerfield, a member of the IMI Group, carries out research into and development of solid propellant rocket motors. It is situated in a rural part of Worcestershire about two miles south of Kidderminster.

A vacancy has arisen for a Computer Programmer in the Computer Section of the Rocket Motor Design and Development Department. The duties involve mainly programming together with some systems analysis of a wide variety of scientific projects.

Applicants will preferably be qualified to a minimum of Higher National Certificate, together with experience of programming and/or systems analysis in a scientific environment. The preferred programming language is Fortran 4. Candidates having, in addition, some knowledge and experience of using an assembler language may find this to their advantage.

Employment conditions include a Profit Sharing Scheme, up to 23 days annual holiday and a contributory Pension Fund.

Applications in writing from men and women quoting reference number 13/79/GPT should be sent to:-
The Personnel Officer (Staff),
IMI Summerfield,
Kidderminster,
Worcs, DY11 7RZ
Telephone: Kidderminster 4061

CHELSEA COLLEGE
University of London

SENIOR COMPUTER OPERATOR

An experienced person is required to join a small operations group currently working two shifts in a time-shared multiple access environment.

Minimum qualifications required are O-level Mathematics and English together with a good understanding of software and operating systems, and at least two years' operating experience.

The post is permanent, five-day week, four weeks holiday.

Salary is the range £3816-£4240 inclusive of London Allowance and Supplements.

The College runs an Elliott 4130 main computer, with batch and 16 user multiple access terminals, soon to be supplemented by a powerful new 16 user time-sharing minicomputer. A Nova 1220 completes the network, which is controlled by a Gandalf PACX3 data communications unit with links to the University network.

Applications and further details from the Secretary, Computer Centre, Chelsea College, Pulton Place, Fulham Broadway, London, SW6. Telephone 736 1244.

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in a manufacturing environment

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We now require Analysts and Programmers to help us extend our systems coverage into new functions and areas and become involved with a variety of applications aimed at improving our manufacturing performance. Increasing emphasis is being placed on the development of on-line systems for stores and shop floor operations.

Current vacancies are for

Analysts

with at least 2 years' systems experience and some expertise of manufacturing, production control and/or finance systems

Analyst/Programmers

with at least 2 years' COBOL or BASIC + experience with a desire to move towards Systems Analysis

Salaries are competitive and generous benefits include excellent pension, life assurance and sickness benefit schemes, relocation expenses, 4 weeks holiday, rising to 5, subsidised staff restaurant and and active sports and social club.

So, if you've got the enthusiasm to learn new skills and want a job with real involvement in a stimulating environment ring Andy Kennedy or Peter Braithwaite now on Welwyn Garden 23434 ext. 3348 or write to either of them at Rank Xerox Limited, Bessemer Road, Welwyn Garden City, Herts.

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If you are either a project leader, applications programmer or systems programmer, and feel you would be interested in working with us in our European Centre situated in the West Midlands, why not make a reverse charge 'phone call to Roger Moore on 021-707 1295 to find out more. Should this not be convenient for you, then send me your curriculum vitae or write for an application form to National Chemsearch (UK) Ltd., Swan Office Centre, 1508 Coventry Road, Birmingham B25 8BL, marked "Confidential — EDP."

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Analyst Programmers to £6,000 + Benefits

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Current development projects in Commercial, Industrial, Scientific and Governmental organisations have created several vacancies for Programmers and Analyst Programmers.

Candidates should be able to produce evidence of their ability, and particular hardware or software expertise is less important than a sound educational background and a desire to develop a career in a challenging and varied environment.

Good salaries linked to a share of profits, together with business expenses ensure a high level of earnings.

Contact Derek N. Hartley — Systems and Programming Manager.

Call 061-872 9428, reversing charges, anytime each weekday to 7.00pm, up to Wednesday 23rd August.

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Warwickgate House
Warwick Road
Manchester M16 0QQ

Fraser Williams

MANCHESTER, LIVERPOOL, LONDON, SHEFFIELD, BIRMINGHAM, GLASGOW, TORONTO

Senior Analyst

Applications are invited for the post of Senior Analyst in the Computing Services Department. The successful candidate (male/female) will be responsible for the systems required by the Administration (e.g. Student Records System).

The Polytechnic has recently installed a DEC-20 to replace a 1905E and the Administration programs are currently being converted.

This post will require a good working knowledge of COBOL, preferably gained on DEC 10 or DEC 20 systems. However, knowledge of ICL 1900 COBOL or RPG2 would also be an advantage. It is unlikely that an applicant who has worked for less than three years with COBOL would be considered sufficiently qualified.

Salary: AP5 — £4461-£4761 plus supplement of £312 p.a.

Further details and form of application available from the Assistant Director and Chief Administrative Officer, Trent Polytechnic, Burton Street, Nottingham. Closing date, 6th September, 1978.

TRENT POLYTECHNIC NOTTINGHAM

SHIFT MANAGER

SALARY £4421-£5328
An additional shift premium of 20% will be paid

The Regional Computer Unit will be introducing a third shift during October, 1978.

An ICL 1903T under George 3 and a CTL Modular One network are currently in use.

A wide range of computer applications are processed covering both commercial and medical activities.

The post of Shift Manager will probably suit experienced Computer Room Shift leaders or Data Control Supervisors, with a good knowledge of G3, who wish to broaden their supervisory and management skills.

The Shift Manager will be responsible for all activities within the Computer Room during normal working hours, and will assume responsibility for Data Control and Data Preparation during evening and night shifts provided that the Managers of these sections are not present.

Further information may be obtained from Mr. Bob White, Operations Manager — Oxford 64861 Ext. 504.
Application forms and further details from (Quoting Ref. V77/78): The Recruitment Officer, Oxford Regional Health Authority, Old Road, Headington, Oxford OX3 7LF. Tel. Oxford (0865) 64861 Ext. 285/357.
Closing date: 31st August, 1978.

Oxford Regional Health Authority

Grow with Telecomputing – nought to a £million in four years
Over 130 users of TPS – the leading software for ICL online systems
Over 60 staff working exclusively on the implementation of online systems on the ICL range

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1900 2900 VME/B VME/K

Telecomputing continues to develop TPS as the outstanding tp monitor for the ICL range. We are now planning our new software for VME/B, VME/K, and for intelligent terminals. We got it right with TPS – now is the time to join the small team who will develop and support another winner.

Applications Design and Programming

Our client services teams continue to expand to meet the growing demand for our software product and project services. We need more experienced programmers and systems analysts/designers. Junior vacancies require at least one year ICL Cobol experience; in more senior positions your specific computer background is less important. All our work is for online systems but you can learn that after you join us.

Our teams have already implemented applications such as order entry systems, production engineering, stock controls and mail order. More are in the pipeline. There are opportunities at all levels. Continuous training will develop your skills and promote your career growth.

Recruiting Manager

To recruit computer systems and programming staff for Telecomputing and for our clients. All our clients are implementing advanced systems using communications terminals and need the staff to design and develop those systems. We are seeking an experienced computer recruitment officer or someone with general computer experience plus the personal qualities and motivation to handle client recruitment assignments. Flexible hours could be considered provided this includes the ability to interview applicants out of conventional working hours.

Project Managers and Consultants

Must have extensive experience in the design and development of online transaction processing systems.

Telecomputing specialises in implementing advanced systems using communications terminals. We operate internationally with every client bringing his own unique system requirements and we need the senior staff to design and develop those systems.

Lecturer (Commercial D.P.)

To join a small team providing formal training to our clients. We require an established lecturer in computer disciplines or experienced computer programmer with lecturing skills and strong training motivation.

You will not spend all your time lecturing. You will have the opportunity to keep abreast of the latest developments by spending part of your time working with the applications, design and programming staff.

Software Sales

To sell TPS – the leading software product for ICL communications systems. We are currently taking one order every three working days and need additional Sales Staff to respond to the tremendous demand for TPS and other Telecomputing quality software products. Computer experience and sales motivation are essential; experience of terminal systems and of software marketing are useful but not mandatory.

Ideally we would like to meet system designers and programmers who have either moved or wish to move into sales.

Telecomputing started in Oxford in 1974 and has more than doubled in size each year. We are now providing advisory, training and implementation services for installing online computer systems around the world.

We have our own 2904 and a 2950 on order. Our activities are continuing to expand and we shall soon announce a microcomputer display terminal. This year we shall double in size again.

When you join Telecomputing you are taking the opportunity to develop your own career in a growth company. We have an informal atmosphere and expect to pay attractive salaries and bonus.

Please write or phone:
Alan Walker
TELECOMPUTING
Seacourt Tower
West Way, Oxford OX2 0ED
Phone Oxford (0865) 723621 (day)
or Goring-on-Thames (04914) 3349 (evening)

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Telecomputing

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Control Data, a world leader in the provision of computer products, services and consulting, has an on-going investment in advanced products, services and technology.

As a result of increased business activity we are expanding our Professional Services Division and the following new positions now arise:—

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To advise clients and ensure that their problems are resolved with the best available solutions and to work with them to a successful conclusion.

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Salary £6000—£9000
To advise clients on their data communications requirements and work with them—independently and alongside the various other divisions of Control Data—in developing and implementing the most suitable hardware/software solution.

SYSTEMS SOFTWARE ANALYSTS:
Salary £5000-£7000
To work in pre-/post-sales environments with Control Data's Cyber 170 operating systems, particularly NOS/BE.

SCIENTIFIC APPLICATIONS ANALYSTS:
Salary £5000—£7000
To provide customer and sales support for Engineering and Management applications such as:— Civil/Structural/Mechanical engineering; Pipe Stress Analysis; Linear Programming; Financial Modelling; Statistics; Project Planning/Control; Graphics (both passive and interactive).

COMMERCIAL APPLICATIONS ANALYSTS:
Salary £5000—£7000
To work in a sales and customer support capacity on such applications as:— Sales/Purchases/Nominal ledgers; Stock/Production Control; Payroll; Data Bases; Financial Systems.

NETWORK COMMUNICATIONS ANALYSTS:
Salary £5000—£7000
To provide support to the Communications Consultants in analysis, programming and implementation of software on Data Communication Networks.

MINI/MICRO SOFTWARE SPECIALISTS:
Salary £5000—£7000
To design and implement mini/micro system based applications, both stand alone and computer network oriented.

PROGRAMMERS:
Salaries range from £3500 for Trainees to £7000 for Chief Programmers/Team Leaders.
We are looking for career minded people to fill the whole range of programming skills from Junior/Trainees, Programmers, Senior Programmers, Team Leaders with experience in any of the following languages: COBOL, FORTRAN, APL, specialized mini systems language/assemblers, to work in commercial or scientific environments and on IBM, CDC and mini computers.

If you are looking for something different, a chance to stretch your abilities, and a real career opportunity—JOIN US.

We offer large company benefits including re-location expenses where relevant and the possibility of travel.

For further information contact Bruce Jones or Sylvia Nuth at 79 Wells Street, London, W.1. Tel: 01-637 0176.

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PROGRAMMERS

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SALARY RANGES . . . Permanent Staff . . . to £10,000 per year
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BP

Programmers

Geophysical Division

We require programmers for vacancies in our Geophysical Division in London and our Geophysics Research Branch at Sunbury-on-Thames. This latter Branch is expected to relocate to London within the next twelve months.

In London the work, involving the use of both Fortran and Assembler, consists of developing and maintaining new and existing software for processing seismic data. We have two Texas Instruments TIMAP systems which are dedicated to seismic processing and our programmers work in close liaison with the Geophysicists using this system.

In Sunbury the programmers assist Research Geophysicists in the design, development and application of data enhancement techniques in seismic prospecting. The work will be concerned with a general purpose system (UNIVAC 1110) and the TIMAP systems

We are seeking applicants with at least two years' programming experience, preferably with a seismic system. A degree or equivalent in Maths, Physics or Computer Science would be a definite advantage.

Our current salary levels together with a non-contributory pension scheme, subsidised lunches and excellent sports and social facilities now represent outstanding conditions of employment

Please write giving full details of age, qualifications and experience, quoting reference FY 581, to **The Manager, Central Recruitment, The British Petroleum Company Limited, Britannic House, Moor Lane, London EC2Y 9BU.**

Systems Engineers Switzerland

c. £18,000 p.a.

Are you a Systems Engineer who's looking for a job that's a little bit different? A job which is secure and yet offers challenge, variety, a wide range of equipment, and international connections? Read on – we've got what you want.

Itel is one of the world's largest suppliers of IBM-compatible mainframes, marketing and maintaining a wide range of products throughout Europe, the United States, Africa and the Middle East. As a result of our continuing expansion, we are now seeking two additional Systems Engineers for our Swiss operation: one to be based in Berne, and the other in Zurich. In each case, after one year's service the job-holder will be given the option of relocating elsewhere in Europe.

Candidates should have experience of IBM large systems, and should be prepared to offer both pre and post sales technical assistance to the marketing staff when required. In addition, they should be able to rectify problems which occur in as many of the following operating systems as possible: OS, VS/1, SVS, MVS, JES2, JES3, HASP.

This is an unusual opportunity to join an expanding international company where job interest is high, and where salary plus benefits reflect your status as an expert. Why not find out more? Send a CV or make a reverse-charge phone call to Barry Martin, Itel International (Europe) Corporation, Bowater House, 68 Knightsbridge, London SW1. Tel: 584 5050.

ITEL INTERNATIONAL

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Data Processing Recruitment Consultants

Analysts+Programmers Manchester

Salaries: c. £5 - 9K

Our client is a major international company recognised as market-leaders in their field and has retained Logistix to assist in recruiting the following Key project-team specialists: Real-time mini programmers, Data base designers, compiler specialists, communications experts (Mini and Mainframe) Application and Software programmers. Experience of any of the following will be especially welcome: RSX-11, RTL11, BASIC, ASSEMBLER, PL/1, COBOL, IMS and D.B. For those who enjoy overseas travel there will be ample opportunity to visit European and Middle-East locations at which our clients have offices.
Successful applicants are likely to demonstrate qualities of leadership potential, determination and be self-starters. It is anticipated that you will achieve very rapid promotion within this prestigious company.
Interviews will be held in Cheshire during August and offers will be made before month's end. Ref.21/F

IBM Contracts E.E.C.

Rates: £9 - 13 per hour + overtime

We have urgent requirements for clients in Holland, Switzerland and France suiting candidates who are either available now or in the near future. A minimum of 2 years solid IBM main-frame experience is a pre-requisite. The following are just some of the openings currently available.
*DOS/VS programmers with DL/1 Holland
*IMS DB/DC programmers O.S. Holland
*IMS DB/DC Systems programmers Switzerland
*IMS DB/DC Analyst programmers Switzerland
*IMS DB/DC Analyst programmers Paris
A sound knowledge of either COBOL or PL/1 is essential for programmers and Assembler in the case of Systems programmers.
Contracts range in duration from 8 weeks to 9 months but only those available within the next three weeks can be considered for these posts at this time. Ref.21/B

Systems Engineers+Programmers Brussels+Thames Valley

Salaries: to £15K (E.E.C.) £9K (U.K.)

An internationally respected supplier of Data Base and Teleprocessing Management Systems requires for its Belgian and U.K. operations several Systems Engineers and Programmers up to consultant level. You should have current experience in the implementation and support of Data Base and/or Real Time Systems, in particular exposure to any of the following — IMS, CICS, TOTAL, ENVIRON, TASKMASTER, SHADOW or ADABAS is highly relevant. Candidates for the Brussels positions should ideally (although not essentially) have some French language ability. Additionally, there is a requirement for the U.K. based staff to travel within this country and occasionally to E.E.C.
Supplemental to a high salary, you will receive extensive benefits including full relocation expenses, life and disability insurance, pension plan, overseas allowances and liberal mileage allowances. Above all, these positions carry excellent prospects.
Interviews will take place within fourteen days of the appearance of this advertisement. Ref.21/C

Honeywell Level 66 Benelux

Salary Range: £12 - 16K

Our client is major international Hardware and Software Systems supplier currently developing new systems in a multi Honeywell Level 66 environment. We invite applications from Senior Programmers, Analyst/Programmers and Systems Designers who have had a minimum of two years continuous experience in one or more of the above capacities on Level 66 hardware. Candidates should preferably have had exposure to GCOS, IDS ISP or TDS, whilst the programming languages used are primarily COBOL and occasionally FORTRAN. Specific applications experience is not regarded as essential.
In the first instance you will be offered a full relocation package under a one year's (renewable) contract. On completion you will be offered an opportunity to relocate to one of the company's several European locations.
These outstanding vacancies will be filled towards the end of October whilst interviews will be conducted at our offices in early September. Ref.21/D

Micro or Mini Specialists London+Home Counties

Salaries £5 -9.5K + Overseas Travel

Candidates should possess a minimum of one years practical involvement in applications or software design and development in either a computer manufacturing or Systems House environment. Those who have Assembler language experience on Mini or Micro Computers particularly DEC PDP 11, DG NOVA/ECLIPSE and TI 900/9900 or specific Micro-Processors preferably Intel 8080/5, Zilog Z80 or Motorola 6800 will be ideally suited.
In addition to an above market sterling salary our clients offer excellent career advancement prospects and the opportunity to travel within Western Europe. Initial interviews on our clients' premises will be held before the end of August. Ref.21/E

Logistix, Freepost 32, London W1E 3YZ
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LOGISTIX

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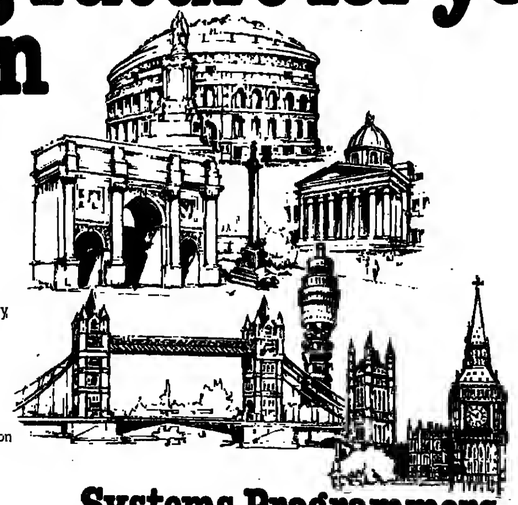

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You'll be working for the largest regional authority in the country providing a wide range of vital services for Londoners.

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Because you'll be having a direct impact on people all over London.
Because there'll be real variety in the work –
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Because we offer:
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- interest free season ticket loans
- generous holidays – over 5 weeks a year
- plus one day extra off per month
- flexible working hours
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- training opportunities

Systems Programmers £4819-£6643

At least 2 years experience of IBM software – and able to work in a team. You will be working with a specialist team generating, developing and maintaining OS/VS1, CRJE, CICS, RES, DL/I, ATMS/STAIRS, MVS, ADABAS, IPS, PLANCODE, ICES & MOSS.

Systems Analyst/ Programmers £4819-£6643

At least 2 years IBM experience, including designing, specifying and writing programs. Knowledge of 8AL or PL/1 or FORTRAN is essential and experience of teleprocessing systems would be an advantage.

ACT NOW...

- Ring Geoff Dalby (01-633 3038), Program & Support Manager, or George Goodwin (01-633 7793), Development Manager, to discuss a career in computing at the GLC.
- Contact Corinna Furse (01-633 3035) for an application form, or write to her at Central Computer Services, Greater London Council, Room 296, County Hall, London SE1 7PB

GLC Central Computer Services

UNIVERSITY OF EDINBURGH

DEPARTMENT OF ARTIFICIAL INTELLIGENCE

RESEARCH ASSOCIATE (SYSTEMS/ APPLICATIONS PROGRAMMER)

A Research Associate (systems/ applications programmer) is required to support the Department's undergraduate postgraduate teaching and research programme. Duties will include implementing, documenting and maintaining interactive list processing programming languages on the Department's DEC PDP 11/40 computer, under UNIX, and developing applications software packages for use by members of the academic staff. Applicants should have a degree, or equivalent qualification, in computer science or a related subject. Previous experience with DEC PDP-11 computers would be an advantage. Salary will be at an appropriate point on the Range 1A scale £3,660-£4,176 according to age qualifications and experience.

Further particulars may be obtained from Dr Howe, Department of Artificial Intelligence, University of Edinburgh, Forest Hill, Fergus Road, Edinburgh, EH1 2QL, with whom applications, together with the names and addresses of two referees, should be lodged not later than 15th September 1978. Please quote reference 6043.

UNIVERSITY OF NOTTINGHAM
Department of Psychology

Experimental Officer (Computing)

Applications are invited for this recently-created post which requires someone with software expertise to provide and develop systems resources for our PDP-11 machines. The maintenance of documentation and system software and the provision of advice and assistance on programming problems would also be important duties. The Department has a multi-access PDP-11/34 machine running RT-11 and UNIX, and satellite GT-40 and LSI-11 machines for laboratory applications. Candidates should have a degree in an appropriate discipline and have experience in scientific and laboratory computing.

Salary will be on the scale SR (3 189 to £4,601 p.a. (under review) according to age, qualifications and experience. Further particulars may be obtained from the Staff Appointments Officer, University of Nottingham. Forms of application should be returned by September 4th 1978. Ref. No. D24.

TEESSIDE POLYTECHNIC COMPUTER CENTRE

PROGRAMMER ANALYSTS (4 Posts)

The Computer Centre provides a service to the whole Polytechnic and has just installed a large Univac computer. A wide range of programming is undertaken, including systems programming and the development of applications software for the academic departments, the Library and the Administration. Programmer Analysts should normally be graduates or equivalent educational standard and preferably have two years programming experience. The starting salary will be at an appropriate point on a scale rising to maximum of, at present £5 073.

Application forms and further particulars may be obtained from Assistant Secretary (Academic), Teesside Polytechnic, Middlesbrough, Cleveland TS1 3BA, to whom they shall be returned as soon as possible.

Satellite Hardware Checkout Systems Netherlands £10,000 +

Logica offers permanent staff positions for analysts and programmers to work on the development of satellite hardware checkout systems in the Netherlands.

You should have experience of high level language real-time programming on minicomputers. Knowledge of CORAL and Modular One experience would be particularly useful.

You should be keen to live in the Netherlands and work in an international agency in which English is the working language. Assignments will be for a minimum of one year with possible extension.

Total earnings for candidates with suitable experience will be from around £10,000.

Call Paula Freed on 01-637 9111 or write to her for an application form – Ref. CGR/H. Logica Limited, 64 Newman Street, London W1A 4SE.

If you're good, we can help you go further

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Software Support Analyst Saudi Arabia £10,000 tax free

Software Support Analyst to manage a Prime 300 system in Saudi Arabia. An outstanding person with a knowledge of PRIMOS and FORTRAN who will make a creative contribution to our software, adapting the system from engineering disciplines to newly identified market-needs in commercial applications such as payroll, inventories etc. In addition to a salary of £10,000 tax free, you will receive accommodation with a two year contract and 15 days leave every 15 weeks. Interested candidates should write immediately (confidentiality is guaranteed) to the Manager International Distributor Operations, Box No 1976, Computer Weekly.

CONTRACTS

At least 2 years' OPERATIONS experience?

If you are a freelance operator now, or intend to go freelance in the near future, contact us for details of our current and future assignments in all areas of the U.K.

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Areas Preferred: First Choice ..... Second Choice .....
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Company Name and Location	From Mth/Year	To Mth/Year	Hardware	Operating Systems/ Software

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SMART EUROPEAN OPERATOR

Our clients, an International Banking Organisation, require a smart, intelligent operator to work in **BELGIUM.** Salaries C 752K.

You should have the initiative and freedom to take on this challenging post which will eventually lead to a progressive career path within the group, and could provide moves all over Europe.

You will possess good communicative skills in addition to solid background in Computer Operations. A joint computer background would be ideal but other experience, particularly IBM 370, would be considered. Reporting to the European Technical Services Manager you should possess some expertise in Teleprocessing.

Any foreign languages spoken would be an added bonus but above all the pre-requisite is for high calibre technical skills and an ambitious outlook on life.

Please reply quoting ref. GD 1500

OPERATIONS PERSONNEL

I CAN FIND YOU A BETTER JOB THAN YOU CAN FIND YOURSELF

Having spent 10 years in Computer Operations, I understand and appreciate the problems involved when you contemplate a move.

Operations staff usually get the thin end of the wedge from most Recruitment Companies, but we at Span take the trouble to listen to your requirements before we act on your behalf.

Please telephone me, Glen Donnelly, so that I may be of some assistance to your search for a new position.

CONTRACT OPERATORS

We have many positions coming available in the near future please telephone for further details.

2 HOBART PLACE LONDON SW1 01-235 3215

UNIVERSITY OF EXETER FACULTY OF SOCIAL STUDIES

PROGRAMMER III

The Data Processing Unit in the Faculty of Social studies requires a Programmer III to join a team of four programmers. The Unit has an R.J.E. link to the University ICL 4-72 computer.

The work is mainly of a statistical nature in the creation and analysis of data banks and preference will be given to applicants with experience of programming in a high level language and the use of statistical packages. Applicants must have a university degree in a relevant subject but previous computing experience is not necessary as training will be given.

Salary according to qualifications and experience will be within the range £3006-£3906 p.a.

Letters of application stating the names of two referees should be sent to Miss Doreen Watson, Appointments Assistant (Appointments), Northcote House, Queens Drive, Exeter, by 31 August, 1978. Please quote reference No. 8828.

SYSTEMS ANALYST

£4750-£5250

NORTHAMPTON

We require a systems analyst to participate in systems development in existing and new design areas for our on line real time system consisting of a B3700 and a nationwide data communications network with 40+ remote terminals.

Applicants with a programming background should have 18 months commercial systems experience (preferably involving on line or data base work).

Relocation assistance will be available if necessary.

Please send career details to **Martin Jones, Robert Horne and Coy Ltd., Huntsman House, Mansion Close, Moulton Park, Northampton.**

Contracts

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If you have the following:
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Telephone: MANHATTAN on (01) 531 9131

We also have a limited number of vacancies for graduates with 6-18 months experience.

THE UNIVERSITY OF SHEFFIELD DEPARTMENT OF ARCHITECTURE

Applications are invited from men and women for a post of

COMPUTER PROGRAMMER

to work on the development of interactive programs for a project which is evaluating the use of computer aided design in architectural practice supported by the S.R.C. Tenure 5 yrs from 1 October 1978. Starting salary £3189 a year. Further details from and applications to Dr. R. H. Lawton, Department of Architecture, The University, Sheffield S10 2TN by 1 September 1978, quoting ref. R190/58.

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ANALYSTS AND PROGRAMMERS

LOCAL INTERVIEWS FOR LOCAL JOBS.

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Systems Analysts c.£5500
Major opportunity in a progressive company. These are ground floor appointments in a new installation and new systems under development will include on-line, real-time and distributed processing. (C/78071)

Programmers from £5000
COBOL programmers also required and positions and salery will depend on qualifications and experience of the successful candidates. (C/78072)

NEWCASTLE

Senior Analysts c.£6000
Major industrial company wished to recruit additional senior systems analysts. Experience in a commercial installation is essential as is a good business background. (C/78073)

Principal Programmer c.£6250
Minimum of 7 years experience of COBOL and ASSEMBLER, Experience of all types of file handling, database and CICS. Previous supervisory experience leading more than one applications team an advantage. (C/78074)

SHEFFIELD

Senior Systems Programmer to £6500
Progressive IBM installation needs Team Leader in its Software section. DOS, CICS, DBOMP, or DL/1 required. (C/78069)

Systems Programmer c.£5000
A young Systems Programmer is also required for a position in the support team. IBM experience essential although not in as much depth as for the senior position. (C/78070)

Please write or telephone Ivor Norton in confidence to arrange your local interview.
THESE ARE SPECIFIC VACANCIES FOR WHICH WE HAVE BEEN RETAINED BY THE CLIENT COMPANIES.

Ivor Norton Management Services Ltd
P.O. Box 63, Copthall Tower House, Harrogate HG1 1TS. Tel: Harrogate 66628.

FORTRAN PROGRAMMERS

West End £3750 to £5800

If you are a programmer with 12 months' or more FORTRAN experience and can see little hope of career advancement in the near future, then perhaps you ought to consider a move.
An opportunity has arisen for a competent and ambitious programmer to join a large manufacturing company and so gain valuable experience in Financial Modelling and Systems Analysis on either IBM or ICL mainframes (they have both).
If you also like the prospect of a Non-Contributory Pension, Season Ticket Loans, subsidised restaurant, and cheap company products, then telephone at once.

Reference PG 33/1

REAL TIME PROGRAMMERS

Central London £4000 to £8000

One of this country's most respected software houses has a number of opportunities in their Real Time Systems Division based in Central London. Positions exist at all levels from Programmers & Analysts through to Consultants. Assembler or Fortran experience in any of the following areas: Message Switching, Production Control, Military Systems or Communications, gained on Minis or Micros would be suitable.
An ability to meet and communicate with clients, an outgoing personality and the willingness to pick up new machines and languages is essential.
If you believe that you could comply with the above specifications and would like a rewarding position with an excellent salary and prospects, ring us immediately.

Reference PG 33/2

OPERATIONS

IBM & ICL

IBM OPS SUPERVISOR £6000
N.London site. Some ICL exp useful. Suit Senior Shift Leader.

IBM SHIFT SUPERVISOR £6000
C.London. 4 years OS with good JCL. Excellent prospects.

IBM SHIFT LEADER £5800
C.London. DOS site. Minimum 3 years experience. Good perks.

IBM SENIOR OPERATORS £5300
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IBM OPERATORS £4400
Minimum 1 years OS experience for various C.London sites.

ICL SHIFT LEADER £4300
2 shifts only. Minimum 2 years experience on GII.

ICL OPERATORS £4100
Various sites need ICL operators with 9 months+ experience.

BURROUGHS, NCR, UNIVAC, PDP, HONEYWELL

BURROUGHS OPERATOR £3500
C.London site working DAYS ONLY. Any B1700 experience.

BURROUGHS OPERATOR £4500
W.London site working EVENINGS. Any B1700 experience.

BURROUGHS OPERATOR C£4000
Any large Burroughs experience needed for Surrey site.

NCR JUNIOR OPERATOR £3300
[illegible] months experience needed for City site. Usual banking perks.

UNIVAC OPERATOR up to £4500
Minimum 18 months OS3 experience for large City based firm.

DEC OPERATOR up to £4250
Company in C.London requires any PDP experience.

HONEYWELL OPERATOR up to £4500
GCOS experience required for large site located in N.London.

DATA CONTROLLERS

We have many positions, both Junior & Senior, at salaries up to £5000

PL1 PROGRAMMERS

West End to £5500 + Mortgage

A leading commercial organisation with an expanding 370/135 installation in the West End is seeking a number of PL1 programmers to work on a variety of new and existing projects.
The positions are ideal for enterprising young programmers with at least twelve months experience on IBM Hardware. A knowledge of OS/VS1, although not essential, would be a distinct advantage.
The company offers a first class salary, and the many generous fringe benefits include Flextime, Season Ticket Loans, and a Subsidised Mortgage.

Reference JC 33/3

COBOL PROGRAMMERS

West London £3000 to £8000

A major manufacturing organisation wishes to recruit additional staff to assist in the implementation of new projects at their West London Computer Centre.
They are interested in programmers with all levels of experience to work on a number of new systems which are in various stages of development.
All programs are written in COBOL and experience on any major manufacturers' Hardware will be considered, as specialist training will be given where necessary to successful candidates.
The company, which has diverse interests throughout industry, offers excellent conditions of employment including free lunches and Life Assurance and the opportunity to develop beyond programming into Analysis and Systems work.

Reference JC 33/4

Datascene Recruitment Ltd
Sceptre House
169-173 Regent Street
London W1R 7FB

datascene **01-439 7871**
24 hour answer phone

ASSISTANT DEVELOPMENT ENGINEER

Data Systems

Newcastle upon Tyne
up to £6774

Based in the engineering Division at Regional H.Q., Killingworth, Newcastle upon Tyne.

The Assistant Development Engineer (Data Systems) will become the leader of a small team which is responsible for advising the Engineering Division on the application of computers especially for Grid Control and the communications and instrumentation section.

The team is responsible for the operation and continuing development of a number of IBM System 7 computers which are used for telemetry monitoring and controlling the VHF radio network. The successful applicant will also be responsible for liaison between the Engineering Division and the Region's Computer Services Department.

Applicants should have a degree in engineering, mathematics or computer sciences, and experience of real-time computer applications in the engineering industry.

Salary range £5712-£6774 inclusive of supplements pending pay award.

Application forms, quoting reference E004R, are obtainable from Personnel Division, Northern Gas, PO Box 1GB, Newcastle upon Tyne NE99 1GB, or telephone Newcastle 685882.
Closing date for applications:
25 August, 1978.

NORTHERN GAS

Computer Operator

£4,500 Herts.

Everest Double Glazing, a member of the RTZ Group, are manufacturers and distributors of high quality double glazing products with branches throughout Southern England

Currently our DP Department is expanding its mainframe from IBM system 3 model 12 to model 150 and therefore an operator, with experience of model 150 and CCP, is required.

The successful man or woman will be able to operate the computer without supervision and decollate and distribute all output. Work will be on a rotating shift basis, ie 9.00 a.m. - 5.00 p.m., Monday to Friday, followed by 4.00 p.m. - 2.00 a.m., Monday to Thursday.

The starting salary of £4,500 includes shift allowance and will be reviewed after 6 months. An excellent range of company benefits is offered.

a member of the RTZ Group

Please write, with details of experience to date to Mr D. Kisg, DP Manager, Everest Double Glazing Limited, Everest House, Cuffley, Potters Bar, Herts.

Expanding Company would like to acquire an established Software House and or Service Bureau. Preferably within the Home Counties.

Please submit brief history which will be kept strictly confidential to.

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1 Great James Street, London WC1N 3DT

COBOL PROGRAMMERS
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Superb opportunity to join small dynamic team. Excellent salaries and conditions. Interesting, challenging, varied work. Full-time or part-time / Freelance.
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Hardware exp. on any mainframe or mini computer
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CONTRACT PROGRAMMERS

Manchester Area
£8-£10,000 p.a.

Six-month contracts available immediately or up to two months' start for ASSEMBLER/COBOL Programmers, HONEYWELL TOS Programmers and PLAN Programmers.
We have many projects to follow and require persons with over three years' programming experience to join our highly successful freelance team.

Please contact:
LEE RICHFIELD LIMITED
(Computer Recruitment Consultants)
Bridge Buildings, Ladybridge Road, Cheadle Hulme
Cheshire SK8 5LL
061-486 0581 day or 061-980 6878 evenings/weekends

••Ludbrook••

SOFTWARE OPPORTUNITIES

Position	Salary / Location
SYSTEMS ANALYST — 2 yrs. min. – DEC PDP11	£6·6K Notts.
PROGRAMMERS — 1 yr. min. – Basic Plus	£4·5K Notts
PROGRAMMERS — 18 months min. – ICL RPG/Cobol	£5K Notts
SNR PROGRAMMER — 2 yrs. min. – IBM 370/Cobol	£6K Herts
OPS. MANAGER — 3-4 yrs. min. – IBM 370/OS VS	£6K Herts
PROGRAMMERS — 1 yr. min. – ANY – ASS/Cobol	£5K Lincoln
SYSTEMS ANALYST — 1 yr. min. – ICL – ANY	£5K Northants
PROJECT LEADERS — 2 yrs. min. – DEC PDP11	£neg. Staffs
PROGRAMMERS — 1 yr. min. – DEC PDP11	£neg. Staffs
SENIOR ANALYSTS — 3 yrs. min. – Honeywell Cobol	£8K Liverpool
ANALYST PROGRAMMERS — 18 months min. – DEC PDP11 Basic+	£5K Leics
SYSTEMS ANALYST — 2 yr. min. – ICL 1902 – Cobol	£6K Leics
PROGRAMMER — 1 yr. min. – ICL 2904 – Cobol	£4K Notts
CONSULTANTS — 1-5 yrs – All Systems	£neg. Birmingham
ANALYST PROGRAMMERS — 18 months min. – All Systems – Cobol	£5K Leics
SYSTEMS ANALYSTS — 2 yr. min. – DEC SFTW House	£neg. Leics
SYSTEMS PROGRAMMER — 2 yr. min. – Honeywell Cobol	£6K Coventry
JNR. PROGRAMMERS — 6 months min. – IBM 370 – Cobol	£3·5K Leics
ANALYST PROGRAMMERS — 1 yr. min. – IBM 370 – Cobol	£5K Leics
SYSTEMS ANALYSTS — 3 yr. min. – ICL R/Time Cobol	£6·5K Derby
PROJECT PROGS. — 18 month min. – ICL SYS 10 RPG	£5K Leics
SYSTEMS ANALYSTS — 2-3 yr. – IBM 360 Cobol	£6·5K Peterborough
PROGRAMMERS — 18 month min. – IBM 360 Cobol	£5K Peterborough
REAL TIME PROGRAMMERS — 18 month min. – All Systems	£5·5K Leics/Notts
REAL TIME SCI. PROGS. — 2 yr. min. – DEC PDP11 RSX 11M	£neg. S/Eng.

For details of these and many other posts please contact in the strictest confidence:-
P. Bell
LUDBROOK MANAGEMENT SERVICES
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Systems Analysts
AND A
Computer Operator

are required to join a well established Data Processing Department at our Lostock factory.
The computer configuration consists of a 512K IBM 370/138 with 3270 on real time systems, 3790 key to Disc and 2790 data collection on line to a system 7.
Software used includes DOS/VS, CICS/VS, POWER/VS, D/BOMP, DL/1, VTAM and SPMOL.
Approximately five miles from the centre of Bolton, we enjoy the benefits of a big town with attractive countryside and Lakeland close at hand. Accommodation prices are well below the national average and we will assist with relocation costs where appropriate.

Applications are invited from both sexes and letters of application giving details of qualifications, experience and current salary should be sent to Mr. J. E. Gibbs, Personnel Officer, British Aerospace Dynamics Group, Hatfield/Lostock Division, Lostock, Bolton, Lancashire BL6 4BR.

BRITISH AEROSPACE DYNAMICS

هكذا عند الأصل

IRISH RECRUITMENT FEATURE

Advertisers are reminded that the next Computer Weekly area feature will be published on August 24 and will highlight career opportunities in Ireland.

Space reservations should be made as soon as possible to:
Owen Kelly — Manchester — 061-872 4211
Eddie Farrell — London — 01-261 8097

Copy Deadline: PM Friday before

COMPUTER WEEKLY
THE INDUSTRY'S WIDEST READ AND MOST REQUESTED NEWSPAPER

★Why not consider moving to a more rural area-relaxed country atmosphere

★Take a step up the ladder-Learn new techniques-improve your prospects

★Increase your salary-consider the perks!

PROGRAMMERS ESSEX

Management services division of major British group with annual turnover of almost £1000m seeks COBOL programmer with minimum 2 years IBM or ICL COBOL within a project team. Programmers will become involved in programs design, coding testing, documentation and maintenance as well as assistance in systems implementation. Co offers —
- ★ Comprehensive range of applications
- ★ Opportunity in more advanced technical projects and a variety of languages and machines
- ★ Paid overtime — flexi hours — subsidised restaurant amongst many of the excellent perks
- ★ RELOCATION expenses
- ★ Salary £5,500

REF 1624

PROGRAMMER ESSEX

Leading clothing manufacturer seeks programmer with at least 18 months COBOL experience. The D.P. dept is fairly small at present but the company is growing very fast. The successful applicant will also act as Assistant to the Data Processing Manager. This is a superb opportunity for young ambitious person wishing to develop with a company. They retain BURROUGHS hardware but will consider any hardware experience. Occasional travel to their head office in London is required. If you want a CHALLENGE phone NOW.
Co offers —
- ★ Exciting new growth potential
- ★ Highly progressive organisation
- ★ Excellent career prospects
- ★ RELOCATION expenses
- ★ Salary £5,000 + COMPANY CAR

REF 1703

SENIOR PROG LONDON

Our client an international company based in the City seeks Senior Programmer with at least 3 years COBOL experience. To work with a team of programmers which is principally engaged in the development of systems used to support the companies telecommunications activities overseas. They retain ICL 1903 under George III but will consider any COBOL experience.
Co offers —
- ★ Continued development with a well planned schedule
- ★ Good promotional prospects
- ★ Progressive organisation
- ★ Opportunity to learn new languages and get on to MINIS
- ★ Salary to £6,300

REF. 1700

MINI PROGRAMMER KENT

Our client is an International company based in a busy main town surrounded by beautiful countryside. They seek a programmer with 18 months' DEC PDP 11 and BASIC + experience. Their hardware is newly installed, offering new development in both manufacturing and financial areas.
Co offers —
- ★ A challenging position with opportunities in a variety of areas
- ★ Surrounded by picturesque scenery and where housing is very cheap
- ★ Above average terms and conditions including 4½ day week
- ★ Salary to £5,500

REF. 1696

MINI PROGRAMMER CAMBRIDGESHIRE

Our client, a manufacturer of high precision instruments, situated in the beautiful rural surroundings of Cambridge. They seek a senior programmer to work on newly installed PDP II under RSMII and BASIC + Ideal applicant will have at least 2 years' experience of BASIC or BASIC + Company will consider ANY MINI hardware experience.
Co offers —
- ★ Variety of new development work
- ★ Flexi hours
- ★ Beautiful rural surroundings with reasonable house prices
- ★ RELOCATION expenses
- ★ Salary £5,500

REF 1580

SYSTEM ANALYST LONDON

Our client a prestigious Merchant Bankers, are seeking a Systems Analyst who has either financial or insurance experience. They retain IBM 370 under OS but will consider other hardware experience.
Co offers —
- ★ Full banking benefits including subsidised mortgage
- ★ Excellent working environment
- ★ Job security with prestige concern
- ★ Salary £7,500

REF 1594

SENIOR PROGRAMMER OXFORD

Our client a major manufacturer of construction materials throughout the UK, with turnover exceeding £200m running a modern computer centre and operating on ICL 1901T (upgrading shortly) they wish to appoint a Senior Programmer. Successful applicant will have comprehensive COBOL experience with PLAN and Filetab an asset.
- ★ Working on own initiative with minimum of supervision
- ★ Opportunity to work in small, friendly dept.
- ★ Relaxed picturesque surroundings not too far from the beautiful city of Oxford. (Due to location applicants should have their own transport.)
- ★ RELOCATION expenses will be negotiable
- ★ Salary £5,500

REF: 1676

OPERATIONS SHIFT LEADER LONDON

Due to expansion within the operations department, our client, a large national organisation require a shift leader. They retain IBM 370 hardware under DOS running a 3-shift system.
Company offers.
- ★ FREE lunches and a season ticket loan
- ★ FREE life assurance
- ★ 20% staff discount
- ★ Salary £5,800 in SHIFT ALLOWANCE

REF: 3062

MINI PROGRAMMERS LONDON

Prestige company operating on a global scale are recruiting persons with 1-3 years experience on ANY MINI ASSEMBLER to work in their new modern City offices. Having large DEC PDP11 equipment and expanding at a rapid rate they have a wide range of on-going projects both in hardware and software areas.
- ★ Extensive training in up to date technology
- ★ Excellent career opportunities
- ★ Training in RSXII, RTII, and RSTS
- ★ Opportunity for future travel
- ★ Salary £6,500c

REF 1476

ANALYST PROG HERTS

One of the country's leading retail organisations seeks analyst programmers to work at Team Leader level on the development of new batch, interactive and distributed systems. Company currently retain BURROUGHS 3700/4700 series hardware and are also investing in PDPII equipment. They seek persons with 2 years experience in design analysis and/or programming (any language) to make a career with them.
Co offers
- ★ Opportunity to learn new languages and get on to MINI computers
- ★ Significant user contact
- ★ RELOCATION expenses
- ★ Salary to £6,150

REF 1655

ANALYST PROGRAMMER S.E. LONDON

Our client, a major British insurance company in South East London, seeks an analyst programmer with at least 12 months analysis experience. They retain ICL 2960 using COBOL although they will consider ANY HARDWARE experience.
Co offers —
- ★ Excellent prospects for career path
- ★ Scope in a variety of areas
- ★ Good perks which include 2 bonus's a year
- ★ Salary £6,000

REF 1695

MINI PROGRAMMER HANTS

Our client is a major British company with business interests in many areas. They seek programmers with at least 18 months DEC PDPII and BASIC + experience. This hardware is newly installed and thus offers a chance to become involved in the development from the beginning.
Co offers —
- ★ Wide range of interesting and new projects
- ★ Flexible hours
- ★ Excellent career prospects
- ★ Annual bonus
- ★ Salary £6,000

REF: 1566

PL/I PROG LONDON

Due to expansion and to cater for future needs this well established D.P. services division retaining IBM 370 with extensive T.P. network seeks PL/I programmers with minimum 2 years' experience. Company offers —
- ★ Continuous development of both commercial and financial applications
- ★ Opportunity to learn CICS and Database techniques
- ★ Promotion prospects within a progressive organisation
- ★ Excellent perks including STLS, staff restaurant
- ★ Salary £8,000

REF 1479

PROGRAMMER SURREY

World leaders in their field, this organisation has an impressive varied range of business interests and is rapidly expanding. At their computer centre they have IBM 370, mini computers and additional new equipment scheduled, consequently needing programmers with minimum 18 months COBOL, ASSEMBLER or RPGII exp. to work as part of project group.
Company offers —
- ★ Opportunity to go into analysis, with good scope
- ★ Fantastic working conditions, including large sports and social club
- ★ Paid overtime, flexi-time, insurance cover
- ★ Subsidised staff restaurant
- ★ Salary to £5,500

REF 1672

PROGRAMMERS MIDDX

A major organisation in the retail trade is now pursuing further interests at a rapid rate. Retaining NCR Century equipment with new Criterion V 8560 scheduled for delivery at the end of the year, they seek programmers with 3 years COBOL experience on any machine for their major stock control systems UTILISING TOTAL Database.
- ★ Plenty of new development work
- ★ Training in DATABASE
- ★ Sports and social club in beautiful grounds, heated swimming pool, squash club, etc.
- ★ Excellent perks, LV discount on company goods
- ★ Salary to £6,250

REF. 1658

DATA PROCESSING MANAGER MIDDX

Our client a major British company with their head office in Middlesex has a vacancy for a D.P.M. to be responsible for all aspects of the department including programming and analysis. Ideal applicant will have strong personality, confidence, management capabilities and be able to liaise at all levels. Company retains DEC PDP hardware and seeks person with a good programming background. This company offers a fantastic opportunity for young person to progress into management.
Co. offers:
- ★ Excellent working conditions
- ★ Security in a growing organisation
- ★ Excellent fringe benefits
- ★ Salary £7,000 + COMPANY CAR

REF: 1705

For further details of the above positions and of the many others we have available in urban and rural areas — please ring our London office: 01-734 0152/ 3010.

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IMS DESIGNERS	HERTS	£250 p.w.
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BURROUGHS GEMCOS	HOLLAND	£450 p.w.

Phone now for immediate and future contracts
Ring Christine Kay / Dave Hayton, Tel: No: 01-734 0152 (24 hours)

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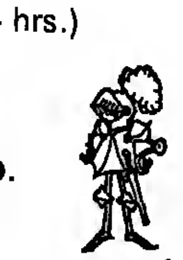

UNIVERSITY OF MANCHESTER
DEPARTMENT OF COMPUTER SCIENCE

Applications are invited for a

RESEARCH ASSISTANT

in the field of Computer Design and Digital Electronics. The post is tenable for three years from October 1st although a later starting date may be acceptable. The project will involve the design and construction of a prototype for a novel data driven parallel computer architecture based on the Data Flow principle. Salary range p.a. £3 860-£4 130. Superannuation.

Applications with full curriculum vitae should be sent by September 8th to Dr. Ian Watson, Department of Computer Science, The University, Manchester M13 9PL

CONTRACT STAFF

Needed now for the following
ICL system 4 operators support and contract staff
ICL 1900 G3/G2 + Operators
ICL 2903/4 Operators
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Mainly for London area
Telephone: Stevenage 023584-7288
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A Company car is provided and there will be opportunity for short term overseas travel. Applicants should have experience of computer controlled systems, floppy or rigid disks, visual display terminals and feel at home with basic machine language and software diagnostic routines.

Apply in writing or phone SLOUGH 38779/0
Bob Allen, Service Manager
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SENIOR SYSTEMS ANALYSTS £7,500+

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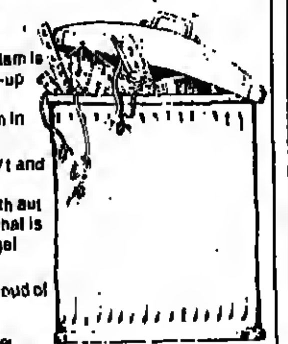

We've been doing it for years with chip-based technology but our system is five years old and we want a clued-up Teleprocessing/Database senior analyst to help make the wires hum in our MkII system.

The technology will be IBM Series/1 and 370 based using Shadow. But no *boffins* please, we work closely with our users in a down-to-earth way and that is how they like it. That's the way we get results.

If you have a track record you're proud of write briefly to:

John Oates, Data Processing Manager
Stewart Wrightson (Services) Ltd, Kingston Bridge House, Church Grove, Kingston-upon-Thames, Surrey KT1 4AG

Stewart Wrightson
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A member of the Matthews Wrightson Holdings Group

City of Salford

COMPUTER CENTRE, SWINTON

SENIOR SYSTEMS ANALYST
GRADE S.O.2 £5727-£6060
INCLUSIVE OF SUPPLEMENTS
OR
SYSTEMS ANALYST
GRADE A.P.5/S.O.1 £4773-£5568
INCLUSIVE OF SUPPLEMENTS
Post Reference 1518/CW

PROGRAMMER
GRADE A.P.4 £4245-£4632
INCLUSIVE OF SUPPLEMENTS
Post Reference. 1516/2/CW

Applications are invited for the above posts in the systems development team at the Computer Centre in Swinton working on new systems for the Council's ICL 1900 series computer.

Applicants for the post of Senior Systems Analyst must have a minimum of three years' experience of systems analysis and have designed and implemented at least one major system. Applications will also be considered from systems analysts with less experience and also experienced programmers who wish to move into systems analysis.

Applicants for the post of Programmer must have at least one and a half years' programming experience in COBOL, or some similar language. A working knowledge of PLAN, communications programs or TP software will be a distinct advantage. Conversion training will be given to successful candidates whose experience has been on computers other than ICL 1900.

These posts are permanent, superannuable and subject to the satisfactory completion of a medical questionnaire. Commencing salary will reflect experience and qualifications. Please write or telephone 061-793 3158 for an application form quoting post reference number to the Personnel Manager, Salford Civic Centre, Swinton, M27 2BN, to whom they should be returned by 1st September, 1978.

Computer Shop opening shortly in West End of London requires a

MANAGER

who must be experienced in computer sales and capable of developing a national chain.
Please apply Box No. 1973, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU.

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HUNDREDS OF BARGAINS!
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As specialist agents in the Engineering, Scientific and Technical industry we now deal with over 4 000 companies throughout the U.K. There is an urgent demand from these companies for experienced and Graduate programmers with FORTRAN experience. Jobs from £3 500 to £8 000 in all areas. Phone us now for a free list of vacancies.

Central Appointments, 26 Windmill Street, London, W1
Telephone: 01-637 5551 (day) — 01-438 3559 (eves.)

Senior Systems Analyst

C. £6,000 p.a.

Our client an international manufacturing company, requires an experienced Systems Analyst (male or female) to become involved with their systems development on a Europe-wide basis. A new installation (IBM 370/138) will be commissioned within the next few months, including Data Base. The appointment will offer considerable opportunity to broaden your experience. It is seen as a career-building position.

The organisation is a market-leader in its field, and sees the DP function as important to both its business activity and continued success.

You will not be working within a rigid hierarchical structure: creativity and individual contribution are encouraged.

Initially assignments will include the specification and design of systems within the manufacturing and marketing functions. Experience in order processing, stock management and production control would be particularly valuable therefore.

You will be based in Yorkshire, but some travel within Europe will also be involved.

Please send your detailed career history to

Bob Schofield,
Professional & Executive Recruitment,
Westminster House, Bond Street,
Leeds LS1 5BE.

Applications are welcome from both men and women

PER
Professional & Executive Recruitment

VACANCIES THROUGHOUT YORKSHIRE

BRADFORD - £5000 SYSTEMS PROGRAMMER
A systems programmer is required for a fairly senior position. Supervision of junior staff. IBM installation running under DOS VS. Must be able to communicate at all levels.

LEEDS - £5000 ANALYST/PROGRAMMERS
Our client is involved in several developments in all areas of commercial business, and there is a general upgrading at their central site. Analyst programmers are required to assist in the technical design and programming of the new systems. IBM installation, ASSEMBLER language, good working conditions and promotion prospects.

LEEDS - £4500 ASSEMBLER PROGRAMMERS
IBM ASSEMBLER programmers are urgently required for an expanding installation. The work is varied and interesting and fringe benefits are excellent. The suitable candidates would be expected to have at least 2 years' ASSEMBLER experience.

SHEFFIELD - £5500 CHIEF PROGRAMMER
A Chief Programmer, with plenty of enthusiasm and drive, is required for a progressive ICL installation. 3 years' COBOL. Ability to control programming staff, resource and advise on software.

LEEDS - £5500 SYSTEMS ANALYST
Our client has an immediate vacancy for a systems analyst to work on their new hardware. A detailed COBOL background is required, coupled with 2/3 years' commercial experience. An excellent opportunity to advance your career in a fast moving and expanding installation.

LEEDS - £4,500 COBOL PROGRAMMER
COBOL programmer required for a fast moving and expanding installation currently installing new hardware. Excellent opportunity for career minded programmer.

BRADFORD - £5500 SYSTEMS ANALYST and TRAINEE ANALYST
An excellent opportunity for systems analyst with 2/3 years' commercial experience for an expanding IBM installation.
Trainee analyst. Ideal chance for good commercial programmer to move into systems work. This position would suit somebody with 18 months to 2 years' programming experience.
Relocation on both positions.

HARROGATE - £4500 ANALYST/PROGRAMMER
An analyst/programmer required for an ICL installation which provides a service to four operating companies. ICL COBOL is required, with 2/3 years' commercial experience. A new database system is soon to be implemented. Career progression is excellent.

LEEDS - £4200 COBOL PROGRAMMERS
COBOL programmers are required for an expanding ICL installation - minis currently being installed. Forward looking company, with long term expansion plans.

LEEDS - TO £5000 COBOL PROGRAMMER
Programmer with an indepth knowledge of IBM COBOL. Experience of DOS/VS Power would be helpful, and a knowledge of CICS would certainly be advantageous. Excellent career prospects in expanding installation. Relocation is available.

HULL - £4500 COBOL PROGRAMMER
Programmer for development work on Production and Business systems. This position would suit a person with 2/3 years' commercial experience. New hardware. Relocation is available if necessary.

To find out more about these and many other vacancies we have available, simply ring IRENE ROGERS or write to our Leeds Office. Interviews can be arranged to suit you.

"If you're considering a move then you should contact Lorien first."

LORIEN COMPUTER SERVICES
OCS House,
Servia Road, Leeds LS7 1NJ
Telephone 0532 444185

SENIOR PROGRAMMER/ANALYST

North Sea Oil — Aberdeen

Occidental, the operators for the Piper and Claymore North Sea oilfields are continuously developing and expanding data processing applications to achieve "well-supported objectives. Our small but highly skilled team of computer specialists play a vital role in providing technical and commercial data processing services to the entire operation with emphasis on developing and maintaining programmes and systems for a wide range of engineering and operations applications.

This vacancy, created by an internal promotion, calls for a mature men or women with a minimum of 5 years' experience in programming and project management. Candidates should hold an engineering degree or equivalent and be able to demonstrate a previous record of successful project leadership and initiative.

Salary will be negotiable at an attractive level and fringe benefits include free life assurance, a contributory pension scheme, 4 weeks' holiday and a luncheon allowance in addition to a generous relocation package where applicable.

If you have the necessary qualifications and experience, and want a challenging future with a forward-looking Company, please apply in writing giving brief career and personal details to:

Mrs Ann Reynolds, Employee Relations Department, Occidental Petroleum (Caledonia) Ltd, 127 Causewayend, Aberdeen AB2 3TP.

Profit from OXY our progress

COMPUTER WEEKLY ISSUE AUGUST 31st 1978

Advertisers are reminded that due to Bank Holiday Monday, on August 28th, 1978, the copy closing date for the above issue will be 5.00 pm Friday, August 25th, 1978

MAI

manufacturers of the

BASIC/FOUR

real-time, disc-based, mini-computers are seeking to recruit

SALES EXECUTIVES

MAI, via their subsidiary the Basic/Four Corporation, are among the market leaders in the manufacture and supply of small business sytems. We have over 5000 systems installed worldwide.

A survey of users of disc-based, real-time mini-computers conducted by Datapro placed Basic/Four unequivocably ahead of the field.

In line with our European expansion we are seeking to recruit Executive Salesmen.

The people we are looking for will be well-versed in commercial applications and have at least 2 years' experience in selling bureau, VRC's or small business systems.

The rewards for the right candidates are:

1. Generous basic salary
2. Quota earnings in excess of £13,000
3. No upper limit on earnings
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5. Big Company benefits, including BUPA, etc.

You would also have, and be encouraged to exercise, the independence, that we enjoy as an autonomous subsidiary of our international parent company.

Join the team selling the most successful small business systems in the world.

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Software Professionals

. . . build an international career with us

Part of Corning Glass Works, a large US multi-national corporation, we are the European Medical Division involved in the development, manufacture and marketing of clinical instruments and diagnostic systems.

Technical Software Supervisor

This is a challenging post and will ideally suit a self motivated professional with a background in software/communications. You should have at least two years programming experience preferably on IBM software for IBM System 3 or 370 machines.

Analyst Programmer

You should have at least 2 years experience, including designing, specifying and writing programs for IBM equipment. Experience of COBOL or RPG2 is essential. In addition to the challenge of systems design you will have the opportunity to undertake analysis training.

Equipment used for both the above opportunities is IBM System 3/15D (192K), based at Halstead Essex.

An attractive salary and benefits package will be offered in addition to opportunities for advancement with our parent company in the UK, Europe and the USA.

For further details and an application form, please contact Brian Murray, Personnel Manager, Corning Medical, Corning Limited, Northern Road, Chilton Industrial Estate, Sudbury, Suffolk CO10 6XD. Tel: Sudbury (07873) 76481.

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£6000 p.a. PLUS

Degree or HNC in Electronics or related discipline, preferably with experience. To further your career in stimulating environment of international computer group in Central Scotland. For details please dial

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DON'T SPEAK—JUST LISTEN
(Have pen and paper ready)

City Office requires an experienced (minimum 12 months) ICL2904 COBOL PROGRAMMER to complement a small team engaged in computerising commodities. Real time programming is executed in Applications Manager in which training will be given if necessary. Salary according to age and experience.

Please apply to, The Data Processing Manager, C. Czarnikow Limited, 66 Mark Lane, London, EC3. (01) 480 6677 Extn. 280.

ata Computer Recruitment

A division of ATA Selection and Management Services, recruitment consultants to Industry and Commerce since [illegible]

HARDWARE APPLICATIONS ENGINEERS

Salary: £1,100 plus CO. CAR + EXPENSES
MANCHESTER AND HOME COUNTIES

Our client, a major manufacturer of international repute require for the SPECIAL SYSTEMS division experienced Applications Engineers.

The division is responsible for the design of non-standard systems and devices in application areas, such as process control, graphics and telecommunications. This may involve small production rooms of specialised hardware.

The duties of the engineers are: —

(a) to define the system in conjunction with the clients.
(b) liaise with the software and design engineering departments.
(c) to correlate the data and compile the costings.
(d) prepare customer proposal with detailed product and software descriptions, and
(e) co-ordinate delivery, installation, and maintain customer contact thereafter.

Applicants ideally should be graduates in electronics engineering or computer science, have in-depth experience of one or more of the following: systems design, hardware design, process control, telecommunications, contract negotiation and project management.

Relocation expenses include all legal fees, estate agent fees, removal costs and subsistence allowances.

For further information telephone Ian Baker on 0272 211035 or contact your nearest ATA office.

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JBA

Junior Consultants

Berks/USA/Europe **Start c. £7,000 + BUPA**

Opportunities have arisen in the European Systems team of this major American company for Analysts or Analyst/Programmers to join as Project Consultants. They will provide support and advice on commercial projects of all kinds to installations throughout the UK and Europe, and applicants should therefore have a good grounding in commercial applications, preferably with a strong IBM bias.

These vacancies have occurred through internal promotions to more senior levels indicating that career prospects are definitely good for able candidates.

An ideal opportunity to gain experience of Project Management at Consultancy level. Travel to the USA and Europe, supported by generous tax-free allowances, will play a major part of the job. Contact: Andy Wright

Analyst/Programmers

London **up to £8,000**

Our client, an international computer services organisation has opportunities for staff to join project teams developing commercial systems.

Applicants should have a minimum of two years of programming in COBOL, PL/1 or RPG2 in a commercial applications environment and have been involved in the design of at least one system. Knowledge of terminal and real-time working would be an advantage.

Career prospects to project leader are excellent.

Salary according to experience. Large company benefits with chance to travel. Contact: Mike Creamer

HOLLAND
Programming Team

up to £12,500

We have been retained to recruit a team of IBM370 OS/VS1 experienced programmers with a very sound COBOL background and complete familiarity with JCL. The group will comprise a team leader, three junior analysts or Senior programmers, and several junior programmers (with at least 18 months experience).

The project applications area will include factory systems, material management, stock control, purchasing and work in progress. Ideal commencement date will be early October and interviews will be held during August in the UK and Holland.

Lovely opportunity to experience living and working in Holland whilst earning good salaries. Contact: Mike Creamer

Systems Analysts

London W1 **£5,500–£7,500**

A major British engineering and construction company has retained JBA to recruit Systems Analysts to strengthen their financial systems team.

All applicants must have worked on financial systems; and for the Senior positions, a minimum of four years relevant experience is expected. The less senior vacancies would commence at salary levels of c. £6,000; Analyst/Programmers looking for a move into full systems analysis should have a minimum of three years D.P. experience.

Good salaries and working conditions, plus the attraction of being part of a dynamic environment. Contact: Andy Wright.

Process Control

Bracknell **up to £0,000**

A small development group has been established in Bracknell by an international engineering organisation to continue their expansion of the industrial systems market. They have immediate opportunities for mini-computer programmers and specialists to work at all levels on these projects.

Applicants must have at least two years experience in industrial or process control applications using mini-computers. A sound background of FORTRAN, CORAL, RTL2 or Assembler is essential.

Excellent salaries, relocation expenses and the opportunity for commissioning work in various parts of the world. Contact: Andy Wright

HOLLAND
CAD/CAM Consultant

Salary & terms negotiable

This senior position will suit a specialist in computer aided design/management wishing to apply his or her experience and knowledge in a consultancy role. The particular skills required are in the areas of interactive graphics applications, numerical control system design, part production systems and design analysis. Dealing with potential customers and assisting the sales and support teams will be the essential part of the job, as well as advising the programming and design teams.

The successful candidate will have a proven track record in CAD/CAM type development and sales, be a highly personable and presentable individual with a willingness to travel and deal with people at all levels. European language ability an obvious bonus.

Attractive senior staff position offering tremendous scope for creativity, job satisfaction and career development. Contact: Mike Creamer

For further information on any of the above vacancies please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

A CHANGE IS AS GOOD AS A REST

PROGRAMMER—COBOL

c£4,500 + benefits **City**

Our client requires young COBOL programmers with a minimum of 18 months' programming experience, preferably in the financial sector. Experience on Honeywell equipment or previous use of OS 2000 would be an advantage but isn't necessary. The company offer good fringe benefits for example cheap mortgages, bonus schemes, free lunches and interest free commuting loans. To work with a small team on many varied and interesting projects with flexitime hours. Enquire now.

AOC 1057

PROGRAMMER—COBOL

c£4,500 **London SE1**

COBOL programmers required with a minimum of 12 months experience on commercial systems. Successful applicants will be involved in a fast expanding department so promotional prospects are good. The company has an ICL 1901T using EXEC but no previous ICL experience is necessary. For more details phone now.

AOC 1037

PROGRAMMERS

£4,000 to £6,500 **Colchester**

Have you had 18 months programming experience in ASSEMBLER — PL1 or related languages and would like to work with Database applications plus gain experience with mini computers? Our client is offering excellent opportunity for people to gain in depth experience of new software techniques and help develop and maintain new computer systems. Applicants should have an IBM programming background. Any experience of TP systems or IBM minis would be an advantage, these requirements assist starting salary but are not completely necessary. For more details enquire now.

AOC 1126

PROGRAMMERS — BASIC/ASSEMBLER

Neg good **Dagenham**

Our client requires programmers with not less than 2 years' BASIC or ASSEMBLER programming. Applicants should be a minimum of 23 years of age and have experience of IBM DOS systems. Successful applicants should expect an increase of their current salary plus benefit schemes from the start employment. More details available, enquire and quote reference number.

AOC 1009

PROGRAMMERS

c£5,000 + benefits **London SW1**

PLAN - FILETAB - COBOL. If you have 2-3 years experience in one or more of the aforementioned languages and would like to work in a small installation on applications with a difference then our clients would be very interested in seeing you. The work location is easily accessible to commuters and the company give interest free season ticket loans to assist. This is a chance to get involved in a small computer department where the work is a lot more interesting and challenging then the normal commercial applications. Any previous experience with George 2 would be definite advantage. The company offer luncheon vouchers and free membership of BUPA. For more details enquire quoting reference number.

AOC 1092

PROGRAMMER—COBOL

c£4,800 + benefits **Surrey**

Required to work in an IBM environment under DOS/VS with POWER. Applicants should have a minimum of 18 months' COBOL programming experience on commercial systems, any knowledge of ASSEMBLER would be an advantage but not essential. The company is currently involved in major redesign and development of all current systems, especially their on-line systems. If you require good job prospects and interesting work also involvement with on-line systems then this position would be of definite interest.

AOC 1045

PROGRAMMERS — COBOL-PLAN

c£4,500+ **Reigate**

How would you like to be involved in the setting up of a new installation? Being one of the first in any new installation is good news for the right people. If job satisfaction is what you are looking for in your next assignment then look no further. Our client is offering relocation assistance to successful applicants who have a minimum of 18 months solid COBOL or PLAN programming on ICL machines. The company specializes in integrated accounts systems using their own specially written systems for their many clients, each system being written for individual clients so there is no modification work to existing or bought packages. This surely must be an opportunity not to be missed, enquire now for more details, quoting reference number.

OC 1141

ANALYST

c£6,000 p.a. **London SW1**

Our client is a specialist organisation connected with the engineering industry. They have asked us to find an analyst with 2 years' commercial systems work to become involved with financial systems of a complex and varied nature. The work is interesting and offers opportunity to develop your analysis skills in a stimulating environment.

AOC 1092

ANALYST

c£6,000 p.a. + benefits **Oxford**

We require someone who has designed and implemented at least one major commercial system on IBM or OEC equipment. In addition we need practical experience of PLI programming. The job involves developing new, and extending existing, in-house systems and packages. Information-retrieval systems are currently being developed. Location is on the outskirts of Oxford, a pleasant rural area, and fringe benefits include a subsidised restaurant, free life assurance and flexitime working.

AOC 1108

SYSTEMS DESIGNERS

c£6,500 **Essex**

Our client requires systems designers to work on the analysis of new on-line systems. Applicants must have proven experience and have a practical programming experience. A knowledge of on-line systems would be useful in developing the company's expanding remote terminal facilities.

AOC 2140

CHIEF PROGRAMMER (PL1)

To £7,000 + benefits **Essex**

Applicants should have a minimum of 4 years solid PL1 programming experience on financial and commercial systems. To take supervision of a team of programmers, some team leadership experience is necessary and a knowledge of on-line systems, preferably on IBM equipment. This position offers a rare opportunity to a senior person to realise his management capabilities whilst working on a variety of interesting new developments.

AOC 1140

ANALYST

Kent

Four years experience of programming and design of commercial systems qualifies you for this position. The company is an established ICL user with a sophisticated 1900 installation using driver. Knowledge of on-line systems and experience in insurance or banking would be advantageous. The requirement is for a senior person, who in addition to the normal analyst duties, is capable of arranging client meetings and taking a large measure of responsibility for current projects.

AOC 1094

هكذا منذ الأجل

Gryphon Computer Recruitment
Essex House Cherrydown Basildon Essex
Contact Chris or Olivia on 0268 282155

GRYPHON

SYSTEMS PROGRAMMERS

c.£4200

British Aerospace is looking for Systems Programmers to assist with Soft Ware Development on two PDP11/45 Processors situated in their flight Development Department.

The job entails analysis of Data, recorded in flight, from sophisticated Military and Civil aircraft.

Applicants, of either sex, are expected to be educated to degree standard and to have at least two years' experience in DEC Assembler Language.

Please write, giving brief personal and career information to:

D. Stopford, Personnel Manager,
British Aerospace Aircraft Group,
Manchester Division, Woodford,
Stockport, Cheshire SK7 1QR.

BRITISH AEROSPACE

A 2M byte ICL 2970 running under the VME/B operating system has recently been installed at the Authority's Computer Services Section in central Bradford and, due to internal promotions and new systems developments, the following staff are now required:

PROGRAMMERS (COMMERCIAL)

REF. RN450
£4035-£4962 p.a.

Applicants, male and female, should be commercial programmers with at least two years' practical experience in writing COBOL programs. Previous 2900 experience is not essential as training will be available where necessary.

PROGRAMMER (SOFTWARE)

REF. RN462
£4035-£4962 p.a.

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For further details and application forms please telephone Leeds 448201 Ext. 275, quoting the appropriate reference number.

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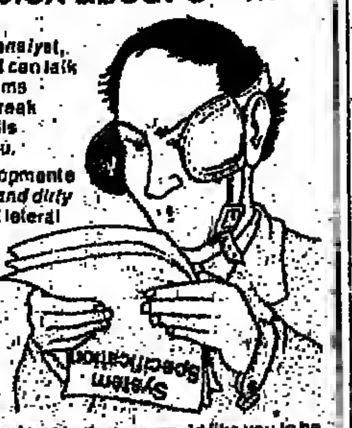

On the other hand if you call yourself a *business systems analyst*, speak *corporate planning* and can talk with an O.R. scientist or systems analyst for the whole coffee break without getting glazed eyeballs then we would like to meet you.

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RECRUITMENT CONSULTANTS

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POSITION	SALARY	EMPLOYER	LOCATION	HARDWARE ENVIRONMENT	SOME OF THE QUALIFICATIONS	REF. NO.
SYSTEMS ANALYSTS	c £6,500	INSURANCE	ESSEX	IBM OS	Urgently required — analysts to provide support services for a TP network. 1 yr. experience + DP. Excellent opportunities for the right people.	33/1
ENGINEERING/ SCIENTIFIC. ANALYST/ PROGRAMMER	AI NEG	BUREAU CONSULTANCY	HOLLAND	MINIS	1 yr. + contract available to scientific/technical people with 3 yrs. experience in an engineering scientific environment to work on a wide range of interesting projects.	33/2
ANALYST/ PROGRAMMER	£6,200	BUREAU	LONDON	IBM OS	Professional DP personnel with knowledge of COBOL and the ability to work on complex systems required to join this established organisation. Graduates considered.	33/3
RPG II PROGRAMMER	c £5,500+	MANUFACTURING CONSULTANCY	LONDON SURREY	IBM syst 3 syst 34	Programmers with 18 months + RPG II experience required to convert/develop a wide variety of commercial applications in a progressive organisation.	33/4
SYSTEMS ANALYSTS	to £6,000	CHEMICAL INDUSTRY	W. LONDON	ANY	First class career opportunities for analysts with 6 months + experience to develop commercial applications in a D.P./TP environment.	33/5
SYSTEMS PROGRAMMERS	c £5,000 + Bonus	SURFACE COATINGS	BERKS	ICL	Excellent openings for COBOL programmer with 2+ yrs. experience and knowledge of George/2903 JCL work in an on-line, technical support environment.	33/6
PL/1 PROGRAMMER	To £6,000 +	SOFTWARE HOUSE	LONDON	IBM	PL1 Programmers with 18 months + experience urgently required for a wide variety of applications within this rapidly expanding organisation. Excellent career prospects.	33/7
ANALYST/ PROGRAMMER	To £6,000 +	MANUFACTURING	LONDON & MIDLANDS NORTH	VRC + MINIS	Analyst/Programmer with 2 yrs. + experience and some COBOL or Assembler to work on a variety of systems using minis and telecommunications.	33/8
SYSTEMS ANALYSTS	To £6,000	FOOD INDUSTRY	SURREY	IBM OS	Analyst with 1 yr. + experience or indepth programming experience required to work in this well-established company on data base applications. Promotion opportunities are excellent.	33/9
COBOL PROGRAMMERS/ ANALYST/ PROGRAMMERS	To £6,000 +	SOFTWARE HOUSE/ BUREAU	LONDON E.C.	BURROUGHS	Programmers and Analyst/Programmers with 3 yrs. experience urgently required to work on interesting commercial applications in this stimulating environment.	33/10
TECHNICAL/ SCIENTIFIC PROGRAMMER	To £7,000 +	TECHNICAL CONSULTANCY	LONDON S.E.	MINIS/ MICROS	Varied and exciting development projects available for scientific technical programmers with 2 yrs. + Assembler/Fortran/COBOL experience.	33/11
SOFTWARE PROGRAMMERS	To £6,000	ELECTRONICS INDUSTRY	S.W. HERTS	ANY	Rare opportunity for the ambitious programmer working on the design, planning implementation and product testing of a wide range of advanced products.	33/12
SYSTEMS PROGRAMMERS	c [illegible] +	PETROCHEM	LONDON W.1 + TRAVEL	MINIS	Two years + experience in assembly language coding and basic programming required. The job involves providing hardware and software support services to remote locations.	33/13
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ANALYST	c £6,000	SOFTWARE HOUSE	LONDON W.1	ANY	Excellent opportunities for DP professionals with experience of DB or GRAPHICS or MINIS or INFORMATION RETRIEVAL to work in a stimulating environment.	33/17
PROGRAMMERS & ANALYSTS	To £6,000 +	DISTRIBUTIVE TRADES	SUSSEX	IBM	IBM COBOL Programmers with 2 yrs. + experience required to work on DB/TP applications in a rapidly expanding organisation.	33/18

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Geographically, you could stay in your general location or travel far and wide. Either way you'll be well paid.

Come and talk to us if you have ambition and you want career scope. Contact Barry Whitesman on 01-734 9681 for interviews in London, Birmingham or Manchester. Or write to him at: Altergo Business Systems Limited, Warwick House, 38 Soho Square, London W1.

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CHIEF FINANCE OFFICER DEPARTMENT
COMPUTER SECTION

ANALYST/PROGRAMMER

Grade APS/6, £3732-£5073

This post offers a challenging and rewarding opportunity to participate in the development of a new ICL 2904 installation due to be commissioned in the Autumn.

Applicants should have a minimum of two years' programming experience in Cobol and/or RPG2 with some systems analysis work. A knowledge of ICL 2904 JCL and ODE equipment would be an added bonus.

The above post is based in Widnes and a system of flexible working hours is in operation. The Council will be willing to [illegible] removal expenses and make available, in an appropriate case, accommodation to the successful applicant.

Applications in writing, giving details of age, qualifications, experience, together with the names and addresses of two referees, should be forwarded to the Head of Personnel and Management Services, Haltan Borough Council, Municipal Building, Kingsway, Widnes, Cheshire WA8 7QF. Closing date: 25th August, 1978.

R. TURTON, Chief Executive

Anglian Water Authority

MIDDLEWARE MANAGER

£9,645-£10,371
(including supplement of £312)
Ref H3D004

The Authority is implementing a regional computer service based on the use of database and data communications techniques. A network of high-speed lines connects the Authority's 19 divisions to the Honeywell dual 66/10 installed at the Computer Centre in Huntingdon.

A Manager is required to head up the Middleware group within the Computer Services Department. This Group is responsible for

- database administration
- data communications
- technical support
- installation planning

The successful applicant will have a strong technical bias and will have spent at least ten years in data processing, including first-hand experience of implementing database and data communications systems.

The Authority offers excellent conditions of service and generous removal expenses if relocation is necessary.

If you are interested or want to know more about these opportunities, why not call Jenny Spencer at Huntingdon (0480) 58181 Ext. 370 for information and an application form.

The closing date for application is 1st September, 1978, and should be sent to:

ANGLIAN WATER AUTHORITY
Brook House, Ouse Walk
Huntingdon, Cambs.

Science Research Council
ROYAL GREENWICH OBSERVATORY

PROGRAMMER

There is a vacancy for a Scientific Officer in the Northern Hemisphere Observatory Procurement Team at the RGO. The successful applicant will be expected to take up duty at Herstmonceux and will be required to make frequent visits to the NHO site on the island of La Palma, Canary Islands which is approximately 8000ft. above sea level. The vacancy is permanent and pensionable.

DUTIES

1. In the RGO as a member of the NHO Project Team, to work in the NHO Computer Department on providing software to collect and analyse data from astronomical detectors using computers; including liaison with electronics engineers and other members of the NHO Division.
2. At the site to commission complete systems, to instruct visitors and staff where necessary and to assist in fault finding.

QUALIFICATIONS AND EXPERIENCE
Applicants should preferably have a good Honours degree with significant computer systems content, or have an equivalent standard of knowledge, training or experience. Experience of Fortran is desirable but training will be given if necessary. A good background in Mathematics would be an advantage.

SALARY scale £2,839-£4,415. Starting salary according to qualifications and experience.

APPLICATION forms and further information can be obtained from Mr. N. Jones, Royal Greenwich Observatory, Herstmonceux Castle, Hailsham, East Sussex BN27 1RP; telephone Herstmonceux (032-181) 3171 Ext. 206 and should be returned not later than 15 September 1978.

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Experienced operators are required by a Stockbroking firm with an Installation at Chingford, London, E.4. The hardware involves an IBM 370/125 using DOS POWER/VS with both local and remote teleprocessing facilities.

Contact: J. Herskovic 01-524 1925
Laing & Cruickshank
15 Hall Lane
Chingford
London, E.4

Sutton, Surrey

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MH/721/CO

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MH/722/CO

For further details and application form please telephone Miss Horne (01) 222 7730 ext 3362, or write, quoting the appropriate reference

Crown Agents

The Crown Agents for Overseas Governments and Administrations, Recruitment Division, 4 Millbank, London SW1P 3JO.

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Digital and N.C.R. computers are in current use, supporting 30+ terminals on-line within the company, as well as a batch processing service.

The successful applicant will supervise and schedule programming within the department and be responsible for continuing the programming standards and disciplines. Applicants should have a sound educational background, experience of over four years in programming and a detailed knowledge of NEAT/3 or MUMPS.

A salary of up to £7,000 p.a., with assistance or relocation, if applicable, is being offered.

For further details of this position, contact:
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Tel: 86344

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UNIVERSITY OF EDINBURGH
DEPARTMENT OF ARTIFICIAL INTELLIGENCE

RESEARCH ASSOCIATE (SYSTEMS/APPLICATIONS PROGRAMMER)

A Research Associate (systems/applications programmer) is required to join a research team which is investigating how children's mathematical skills are affected through using programming as a method of exploring mathematical processes.

Duties will include implementing a non-numerical interactive programming language on a DEC LSI-11 machine under RT11 developing systems software for other types of microprocessors, and writing applications packages for use by schoolchildren. Applicants should have a degree, or equivalent qualification, in computer science or a related subject. Previous experience with DEC PDP-11 computers, and a working knowledge of ASSEMBLER would be an advantage.

The post is available for three years. Salary will be at an appropriate point on the 1B scale £3,189-£4,601, according to age, qualifications and experience.

Further particulars may be obtained from Dr Howe, Department of Artificial Intelligence, University of Edinburgh, Forrest Hill, Forrest Road, Edinburgh EH1 2QL with whom applications together with the names and addresses of two referees should be lodged not later than 31st August, 1978. Please quote reference 5042.

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Vacancies exist within our data processing division for Scientific Programmers and Computer Operators with some experience and an interest in

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Experience in Seismic Processing and/or Mini Computers a definite advantage. Our offices are in Swanley, Kent, adjacent to the Swanley main-line station which is 25 minutes from Victoria.

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(A member of the English China Clays Group of Companies)

THE SALES BIT

Finding where the buck stops

THE salesman can't always get it right. There is bound to be a situation somewhere along the line when, despite taking all the basic selling precautions, he suddenly discovers that the person he believed to be the decision maker has to go to some other source for final approval. This might involve a parent company board, a select committee, a direct superior or even a union.

This type of situation calls for swift action, objectivity and boldness on the part of the salesman. He must endeavour to make direct contact with the decision maker, and only a straight question can make it happen. "Who is the final decision maker? Can you contact him and see if it is convenient for us to meet briefly while I'm here?"

If the response is negative then: "Will it be easier for you to arrange an appointment for me now, or shall I contact his secretary on the way out?"

Often the prospect will respond by asking the salesman to leave everything to him. In that circumstance, it is difficult, but not impossible, for the salesman to do otherwise.

In this circumstance, the salesman has lost control of the sales negotiation. Effective selling cannot be performed by proxy, but the chances will never be improved by simply accepting the circumstances and letting the third party get on with it.

The salesman has to view the situation through the eyes of the newly revealed decision maker(s). One thing for sure, no decision is going to be made in favour of his product unless those involved know what they are expected to decide upon and why. This is where the formal sales proposal comes into its own.

More bold questions need to be asked. "When will the decision be made? How many people are on the board?" and when he knows the relevant facts: "Right, I'll prepare copies of our proposal for each of them and make sure they are delivered right away".

Perhaps, the third party will ask the salesman not to take the trouble. "It's no trouble", he should reply and then change the subject.

A covering letter should accompany each individual copy, perhaps indicating the date of the appropriate board meeting, and certainly referring to the "benefits" section.

This is essentially an unsatisfactory sales situation, but one where handing over a bunch of technical leaflets for onward transmission will not suffice. What makes it even more unsatisfactory is that it would never have occurred if the salesman had got his pre-approach analysis right or even asked the most important question of the first sales call: "Who makes the decisions around here?"

TRADER

BOOK REVIEW

Reading for Basic understanding

Illustrating Basic, by D. Alcock. £1.99. Cambridge University Press.
The Basic Idea, by R. Forsyth. £1.95. Chapman and Hall.

ALTHOUGH both of these introductory books are written for students without any prior knowledge of computing, the approaches they follow are diametrically opposed.

While both authors acknowledge the lack of standardisation in Basic, Alcock accordingly treats the "need for portability as an axiom" and describes the language so that programs may be written without dependence on any particular version of Basic.

Forsyth adopts the policy of sticking to one representative implementation of Basic, namely Digital Equipment's. This later approach severely limits the utility of the book.

To be fair, Forsyth does give students some guide lines to be followed when portability is required, but these occur almost as an afterthought in the last chapter and occupy less than half a page.

On the other hand, some students may find Alcock confusing in that he often enumerates several possibilities in describing effects and forms of statements.

Alcock's thoughtful analysis, however, should prove to be a source of aid rather than confusion for most students.

One small point, but well worth noting, is that the spiral binding of Alcock's book means that it may conveniently be flopped open for reference when working at a terminal; Forsyth's book is more conventionally bound and does not offer this ease of handling.

Also, there are minor errors in the listings in both books, but my guess is that students tutored in Alcock's critical approach will suffer less from these than those following Forsyth.

Both books more or less accomplish the aims of their respective authors. For my money, Alcock's text is the one more worthwhile having, and I cannot help thinking students' money will be better spent on it as well.

CORNELIA BOLDYREFF

Puzzle answer

THE formula is: Constant $= \frac{1}{2}(n^3 + n)$, so the constant for a 16 x 16 square is 2,056.

A move to Southampton offers Computer Staff more than just a change of address.

Southampton City — Right at the Centre of Things — Ideally situated close to South Coast Resorts. Easy access to the New Forest and the West Country. Superb sporting and leisure facilities. A fine shopping centre. Just a few of the benefits a move to Southampton could bring Computer People who want more out of life than just job satisfaction.

Southampton City Council has a number of vacancies in its Computer Division for suitably skilled staff. Employment benefits include —

● Subsidised Canteen ● Staff Social Club ● Job Security.

. . . and dependent upon circumstances . . .

£500 removal and resettlement allowance
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Temporary housing accommodation.

Immediate vacancies within the Division include

SYSTEMS ANALYST/ PROGRAMMERS

Workload in the Division has created an urgent need for people with varying degrees of practical experience of DOS/VS and who have a knowledge of COBOL. Preference will be given to those with formal qualification. Salaries are negotiable up to £5,073 p.a. according to experience. Working hours are flexible.

COMPUTER OPERATOR

An operator experienced in the operation of the IBM 370 using DOS/VS is required. The successful person will join a skilled team and should be prepared to work alternative shifts over a five-day week with overtime working to meet peak loads. Salary up to £3,651 p.a. plus shift allowance of 14%.

Our hardware comprises an IBM 370/125/2 with 3340/44 Disc System and mag. tape; a Burroughs B80 Mini for cash receipting and a Redifon Seacheck System for Data Entry.

For further details and application form contact the City Treasurer, Civic Centre, Southampton SO9 4XD. Tel: Southampton 23855, Ext. 498.

(Closing date for applications is 30th August.)

Southampton City

SOUTHAMPTON

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COMMUNICATIONS SYSTEMS

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WESTERN HOME COUNTIES

Our client is a member of a multi-national corporation and is engaged in the development of communications systems for a variety of applications. Sales engineers are required for the marketing of these systems in the UK and overseas in both Defence and Commercial markets.

Applicants should have experience in one or more of the following areas -

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- Systems engineering in message switching or related fields

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GRS

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Wrangler

SYSTEMS ANALYST/PROGRAMMER

Wrangler, one of the world's leading manufacturers of leisurewear, want to offer an interesting job to an enthusiastic professional who has at least 1-2 years' systems and programming experience in a commercial environment. You must have a knowledge of Cobol or RPG and any experience of on-line systems could be a possible advantage.

You will join a small EDP team at our Head Office and Distribution Centre in Calverton and have the opportunity to become very involved in the activities of the site. The Company has an IBM System 3 and knowledge of this hardware would be useful.

Men or women interested in this position should telephone or write for an application form to

Mr. Alan J. Osborn, Personnel Manager
BLUE BELL APPAREL LIMITED
Calverton, Nottingham
Tel: Woodborough 3086

Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth

Block 11 (Physical Block)

Hex and Zap are still up in the mountains awaiting Cleo and Lambda, unaware of their plight; and now Ascii has disappeared.

"ASCII's gone!" Hex's shout woke Zap.

"Cool it, will you?" snorted Zap.

"But we're in trouble. We've got to do something."

"We always were. What do you suggest?"

"We'll have to go and find him."

"How?"

"By radar."

"You mean he won't maintain radio silence? Then we're better off without him," stormed Zap. "He'll lead the whole pack onto us."

Hex was infuriated by Zap's defeatist attitude. There were times when he clearly regretted leaving the security and logicality of the System to work alongside a bunch of crackpots. However on this occasion Hex had to admit he had a point.

"We could follow his tread marks," ventured Hex lamely.

"And what happens when Cleo and Lambda arrive to find us gone?"

The exchange had gone badly for Hex, and he knew it. He took stock. His one really dependable ally was lost. The two girls were probably in dire straights, perhaps even in the hands of the Error Squad. Zap was subject to bouts of cantankerousness, and apparently believed that with their limited resources they could hope to achieve little more than a token Kamikaze mission. On top of this, they had neither offensive nor defensive weapons; and needless to say had yet to decide on a strategy. The outlook was undeniably bleak.

At that moment a small lump of earth, dislodged higher up the tunnel, rolled down and hit Hex in the back. He sprang up like a startled deer. From beyond their view came the sound of footfalls.

"Anyone at home?" echoed a tentative greeting.

Hex recognised Cleo's voice. His feelings were too strong and too mixed even to experience without perplexity, let alone to express. It was left to Zap to answer the call.

Shortly afterwards Ascii entered. Cleo followed, limping and supported by her sister.

"Sorry we're a bit late," said Cleo.

"Ascii scented us," added Lambda. "He came down to help us with the final ascent."

Hex could see that Cleo's knees were covered by two discs of caked blood, but her spirit was undimmed.

"I could do with a bath," she proclaimed. Hex led her, hobbling, down to the pool in the centre of the crater. She dipped a toe in the water. Immediately she recoiled. "It's hot!", she exclaimed. "It was freezing last time."

Hex immersed one finger, then his right hand. It was distinctly warmer than the previous morning when it had been lukewarm.

"We've got a warm spring," he replied. "I noticed it yesterday, but today it's a bit hotter. It could be medicinal. Go on, take the plunge!"

Before she could reply, Zap and Lambda had joined them, bent on horseplay, and moments later all four were splashing around in their private heated swimming pool like children, with Ascii barking excitedly on the water's edge.

After their dip, they made plans. As night fell they were engaged in deciding how to strike their first real blow against the Network. Hex favoured adapting Dr Null's concept and equipping Ascii as a gigotic de-stabilizer, to exploit the System's vulnerability to gigotic induction; but Zap had his own ideas.

"What do you know about gigotic processes?" began Hex.

"We had a lecture from Igor Gigotski himself in my first year at Brainstorm College," replied Zap. "He told us about the standard counter-measures."

"But Gigotski perished in Russia forty years ago."

"Well, he looked in good shape to me."

This not only undermined Hex's fundamental premise, it eroded his faith in Dr Null's last confession. While he tried to reconcile it with what he knew, Zap got into his main theme.

"The only way to blow the System's collective mind is with LSD."

It sounded like a blast from the past. "With what?", Hex queried.

"LSD — Large Scale Disintegration. I've thought it all out. The System depends on the integration of astronomical numbers of incredibly tiny components, all based on wafer-thin slices of a silicon substrate. It is literally built on sand. Dissolve that, and you break up the System."

"A hardware solution?" was Hex's reaction. It didn't appeal to him.

"'The hardware they come, the hardware they fall'," said Zap, misquoting Dr Null.

"But what do we dissolve it in?"

"The most powerful solvent known to the mind — Leibnizian Syllogistic Acid, the only substance that can be transmitted along wires in monadic form and re-materialised by a signal pulse."

"Don't blind us with science," commented Hex. "You're saying you're going to drug the entire System."

"Like they've never been zapped before."

"Can we make this stuff?" asked Lambda.

"We don't need to," stated Cleo, before Zap could reply.

They turned to look at her. When she had their undivided attention, she continued. "There's a vat of it at Sprocket's Hole. They used to press mushrooms and ferment the juice using their own special recipe. I think that's what got them banished in the first place."

"Right, that's settled," concluded Zap. "We get down there and pump it into the Network's arteries. Let's have a show of hands."

Only Hex's arm did not rise. In vain, he tried to persuade them that the effects would not spread fast enough and could be localised, unlike a gigotic field. Their minds were made up.

"Now all we need do," said Zap, "is pick a name for ourselves to go down in history. How about The Circuit Breakers?"

Cleo suggested 'the human rights movement' but got no support. After some disputation Hex proposed 'the gang of 4½'.

"I see," said Cleo: "four people and a dog."

"No," chorused the three androids in unison, "four automata and a human," and burst into laughter.

The insult hurt Cleo deeply. The atmosphere became suddenly charged. In the semi-dark cave Hex reached out and put a hand round her shoulders to comfort her. Before he knew it, he was kissing her full on the mouth.

Could this be the start of something? Yes.

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